

# COMPUTERWORLD



## Speedy delivery

MAIL-ORDER 486 PC BRANDS FARE WELL AGAINST OTHER NAME BRANDS IN USER SATISFACTION WITH OVERALL SYSTEM PERFORMANCE.

SEE BUYERS' SCORECARD, PAGE 160

Vendor	Performance satisfaction score
Gateway 2000	8.8
Dell	8.5
Compaq	8.5
AST Research	8.1
IBM	8.1

MAXIMUM POSSIBLE SCORE: 10

## IBM gives OS/2 unit more freedom

By Rosemary Cafasso and Christopher Lindquist  
WHITE PLAINS, N.Y.

IBM confirmed last week that it is shaping its desktop operating system business into a more independent unit as part of an ongoing plan to make its PC businesses more competitive.

The company could also eventually spin off the business as a separate company, much as it did with its desktop hardware business two months ago, although no specific plan is now in place, a company spokesman said.

Information systems executives said they would welcome a more focused effort from IBM's desktop business and believe it could bring about better service and quicker

IBM, page 12

## PCs in short supply

By Michael Fitzgerald

**■ The IBM PC Co. and Compaq Computer Corp. have been asking users to hop on a low-price bandwagon, but as the crucial fall buying season heats up, the two giants of corporate PC sales have quickly discovered that a high demand for seats is far exceeding supply.**

"This is a disaster for us — customers want to manage their MIS installations and roll out networks, sales force automation projects, etc., and they're furious over this," said William Tauscher, chairman and chief executive officer of ComputerLand Corp. in Pleasanton, Calif.

Success, it seems, can be hard to handle. The shortages result from a combination of record demand and an inability to get extra parts.

IBM acknowledged that demand exceeds supply for much of its Personal System/2 line from the Server 295 on down, and there is probably a two-month backlog for its ThinkPad portable line. It also appears to be on the brink of breaking its promise to meet demand for its low-cost PS/ValuePoint line, according to numerous industry observers.

IBM has said it initially delayed ValuePoint's launch to make sure it would not repeat Compaq's continuing supply problems, delivering 14,000 low-end ValuePoints to dealers the week before it announced the product.

Yet while IBM officials said it is on schedule so far, several well-placed

reseller executives said it is a few days behind promised deliveries of 486SX-based ValuePoints. IBM said it can fill orders for the 486DX models, though that will not be clear until later this month when the machines are scheduled to ship.

And callers to IBM's 800 line for ValuePoint systems are experiencing a near-two-month wait for new systems, while some major customers contacted said they were

being told by IBM reps to expect similar delays. "We've been told that [ValuePoint] will probably not be available in quantity for six weeks," said Richard E. Nelson Jr., vice president of agency systems at New York Supply, page 12

## Aiming high

## Microsoft pursues IS

By Christopher Lindquist

Abetted by an industry shift to client/server computing, Microsoft Corp. has spent the past two years attempting to shed its skin as a shrinkwrapped vendor. Since it released Windows 3.0, the company has been striving to position itself as a software supplier capable of establishing strategic, long-term relationships on multiple levels with large, corporate information systems departments.

**What does Microsoft need to do to convince IS it can be a dependable, strategic ally? See page 20.**

Microsoft has rolled out a number of changes designed to bolster that effort, including vastly improved service and support, more flexible licensing policies, a separate consulting arm and an entire division devoted to corporate customers.

And last week, the company confirmed that it will expose yet another stratum this January in its bid to capture IS fealty, including simplified purchasing and licensing options and more robust support (see story page 20).

Despite these efforts, interviews with 12 IS managers and a separate poll taken by the CW Database Division last week indicated the microcomputer software giant may face more than a few obstacles in its bid to achieve first-class citizen status in large corporations. Not the least among these hurdles will be the issue of trust. Microsoft has a reputation among users and developers for constantly tweaking delivery dates and product plans.

Microsoft, page 20

## SDLC routing snags users

Glitches cause some to find networking workarounds

By Elisabeth Horwitt

Bad user karma is overwhelming Cisco Systems, Inc.'s current dogma that a router can handle Systems Network Architecture with the same ease with which it directs local-area network traffic.

Painful experiences with bugs, poor performance and lost IBM SNA sessions are causing early implementors of Cisco and other router vendors' Synchronous Data Link Control products to rethink their internetworking strategies.

They are also causing users to question whether Cisco has the expertise to develop its own SDLC products rather than farming them out to

an SDLC expert, as Wellfleet Communications, Inc. and Proteon, Inc. are doing.

SDLC specialists such as Sync Research and Netlink Corp. have consistently provided more options and better throughput than the router vendors, user sources said.

Questions on its SDLC credibility come at a bad time, given that Cisco has just launched an all-out effort to get its Advanced Peer-to-Peer Internetworking protocol accepted as an industry standard for routing SNA traffic.

Indeed, more than one user company is rethinking its strategy of using a router, which was originally designed to handle LAN-to-LAN traffic

SDLC, page 7

## There's no generation gap here

Reports of an IS generation gap are greatly overrated.

An exclusive *Computerworld* attitude survey of more than 1,400 information systems professionals found that young and old agree on the importance of PCs, local-area networks and client/server technologies to success in the field, though they say mainframes are far from dead. However, the generations don't always concur about broader business and societal issues. See page 148 for complete survey results.



Handy and Harman's Ron Flink: Age doesn't count

# Executive Briefing

## A comprehensive guide to the week's news

### INDUSTRY

**Microsoft** aims to cozy up to large customers by putting a new face on revamped strategies. *Pages 1, 20*

**IBM** cuts the cord on its desktop operating system business. *Page 1*

### MANAGEMENT

Surprisingly few major differences in attitudes exist between the old guard and young turks in IS. An exclusive *Computerworld* survey shows broad agreement on a variety of issues. *Page 148*

### OUTSOURCING

**McCaw Cellular Communications** will let expire an outsourcing deal with Cincinnati Bell Information Systems in favor of a real-time, in-house Unix system aimed at improving customer support and billing. *Page 10*

**Outsourcing at HUD** surpasses expectations, but efforts to shore up financial applications in the wake of the 1989 scandals are moving slowly. *Page 16*

### COMDEX

It would be possible to run Comdex by computer, according to industry observer Esther Dyson. But that would remove most of the attraction. Besides, the possibility of a big payoff is what keeps people coming. *Page 33*

**Comdex** kicks off the quest for productivity with multimedia, next-generation portables and workgroup computing. Also on tap are a host of products in the sectors of PCMCIA, wireless technology, multiprocessing, high-end servers and portable computing. *Page 14*

**Microsoft** will unveil the first pieces of its database strategy, including the Access database, a GUI-based development environment and a means to connect with third-party PC databases, rolled into one. *Page 12*

**Lotus** will unveil a 32-bit version of CC:Mail for OS/2 2.0. *Page 14*. The company will also show Improv for Windows and announce plans to ship it early next year. *Page 14*

An old-fashioned shootout at high noon is expected as IBM, Borland, Novell and WordPerfect announce a client/server application interface for databases to counter Microsoft's widely accepted Open Database Connectivity API. *Page 12*

### ENTERPRISE NETWORKS

Early implementations of IBM SDLC traffic on routers has run into glitches, causing users to rethink that strategy. *Page 1*

**IBM** plans to deliver frame-relay technology by mid-1993 and ATM products within a few years, but it won't offer SMDS. *Page 99*

Meanwhile, **ATM** plans are coming together for router vendors Wellfleet and Cisco. *Page 99*

**MCI** proposes the FCC license spectrum for building wireless personal communications networks to teams of companies, which can quickly construct more far-reaching networks than individual licensees. *Page 10*



### PC hardware

- Too many customers have hopped on the sweet seats set out by IBM, Apple and Compaq, who find they can't get their product bus rolling because demand is too heavy. *Page 1*
- When it comes to PCs, productivity is beside the point, says science fiction author Bruce Sterling. What PCs are really all about are glamour and personal power. They can make you seem more impressive than you are, and they give you access to just about anyone or anything. *Page 33*
- Modifications to PC power supplies could eliminate some of the need for UPSs. *Page 11*
- Conversions to IBM's newest DB2 release go well, provided maintenance is current. *Page 113*

### Technology surveys

- Price wars may promise that you can get cheap 486 PCs, but getting a true Best Buy entails carefully examining your applications load to determine what system you really need. It also means writing detailed bid specifications, inspecting each candidate system to check quality and leveraging volume purchases for even better prices. *Product Spotlight* on 486 PCs provides the practical tips you need. *Page 153*
- Gateway 2000 486 PC users give their systems the highest satisfaction ratings, besting Dell, AST, Compaq and IBM. *Page 160*

### Client/server

- It's true that moving to client/server can save you as much as 50% on hardware. But it is also true that labor, training, telecommunications and other costs can eat away at those savings. *Page 169*
- Client/server IS staffs at United Airlines, CTE, Texaco, ITT Hartford Insurance and Harvard Community Health Plan are forging ahead with downsizing plans, but they admit that it hasn't been an easy passage. Two key hang-ups: training and the lack of tools for capacity planning, network management and predicting performance. *Page 169*
- Computerworld* nears its goal of converting to a client/server, Unix-based production system in time to implement a redesign of the paper. *Page 92*
- Levi Strauss took client/server systems for a test drive and liked what it learned. *Page 127*
- Apple users are eating up an Apple document about client/server. *Page 4*

### Downsizing

- A planned 5,000-person work-force reduction at The Travelers could cut sharply into the firm's professional IS ranks — but the importance of IS in the firm's business mix is going nowhere but up. *Page 10*
- With Wang, its minicomputer supplier, suffering fi-

servers with NetWare, is one step in DEC's plan to offer more solutions packages. **89**

■ LAN vendors partner with IBM-savvy shops to merge SNA and Token Rings into a multiprotocol backbone. **103**

■ EO, Inc.'s new communications devices present IS with a challenge — and an opportunity. **105**

### Support issues

- Technical editor Charles Babcock examines the real cost of peer-to-peer technical support, citing his own experiences and a recent study from Nolan, Norton maintaining that this approach to support costs more than the tangible expenses for hardware, software and IS technical support. **113**

### LANs

- Watch for a major impact on peer-to-peer LAN vendors from Windows for Workgroups. **49**
- The DECAvantage program, featuring integration of



Does your job give you nightmares? See page 177

ncial problems, a Cleveland law firm is looking for ways to make use of its 40 minis while planning for a future based on PC LANs. *Page 53*

### Software pricing

- Computer Associates continues to move away from tiered pricing, introducing simpler, more flexible enterprise pricing models for users of its mainframe, Unix and PC software. *Page 6*

### Large systems

- Hitachi Data Systems CEO John Staedke plans to maintain HDS' steady course in the choppy waters of IBM-compatible mainframe marketing. Staedke says HDS will stick to its plan of growing at about 15% a year. *Page 197*

- EMC is ready to ship a mainframe storage system that observers say outperforms IBM's comparable offerings and beats Storage Tek to market. *Page 8*

### Midrange systems

- DEC finally unwraps a range of Alpha platforms with a staggered shipment schedule. The company also introduces some homegrown software, promising third-party packages to follow shortly. And for those still waiting, the firm confirms that the final pieces of DECnet/OSI are slated to roll out by mid-1993. *Page 24*
- Chicago's city library runs its on-line terminals as if they were ATMs in a bank and has a fault-tolerant host in its data center. *Page 110*
- Dallas/Fort Worth Airport has a Pyramid-based technology plan to help it expand into what may be the world's largest airport by the year 2000, but a number of integration challenges lie in the way. *Page 120*

### Databases

- Sybase shows its 1993 product lineup but declines to give pricing or shipment dates. Users eagerly await the products. *Page 15*
- Oracle's Glue API for client/server applications is intended to spur the development of more Windows programs that access Oracle database servers. *Page 37*



ease-of-use features for installation and administration. **49**

■ Sun goes after the data center and the desktop markets, while HP keeps its leading edge in high-performance workstations for the technical and scientific worlds. **4**

### Computer careers

- If work-related worries are keeping you up at night and affecting your job performance during the day, you're not alone. This week, we identify some of the symptoms and offer some suggestions for easing work pressures. **177**

### Applications development

- Data modeling catches on in some large companies as a way to clean up conflicting data types, although the effort is largely start and stop. **127**
- Visual Basic from Microsoft may help Basic gain acceptance among professional programmers. **128**

### Portable computers

- Color becomes routine for notebook vendors as Compaq and AST lead a pack of announced bringing color to their screens. **37**

### Departments

- |                         |        |
|-------------------------|--------|
| Advanced Technology     | 28     |
| Application Development | 127    |
| Buyers' Scorecard       | 160    |
| Company Index           | 195    |
| Computer Careers        | 177    |
| Computer Industry       | 197    |
| Desktop Computing       | 37     |
| Editorial/Viewpoint     | 32, 33 |
| Enterprise Networking   | 99     |
| Friday Stock Ticker     | 196    |
| In Depth                | 169    |
| Inside Lines            | 198    |
| Large Systems           | 113    |
| Management              | 148    |
| Marketplace             | 189    |
| News Shorts             | 6, 16  |
| Product Spotlight       | 153    |
| Regional Scope          | 180    |
| Trends                  | 198    |
| Workgroup Computing     | 49     |

# INTRODUCING NEW CA-UNICENTER: MAKING THE WORLD SAFE FOR UNIX.

Never fear.

New CA-UNICENTER® is here.

The first complete systems management software for UNIX. But what it really is, is complete peace of mind.

Never again will you worry about security.

Control.

Or administration.

CA-UNICENTER for UNIX gives you all the systems management technology you've been waiting for.

**CA90s** Everything you need to control your entire UNIX system and turn it into a safe, productive environment for mission-critical computing.

CA's Computing Architecture For The 90s.



Created by the experts in systems management, CA-UNICENTER combines everything CA has learned over the past two decades as the world's leading systems software company.

It's the most powerful, flexible and easy-to-use systems software ever developed.

And it's available today. So why take a chance?

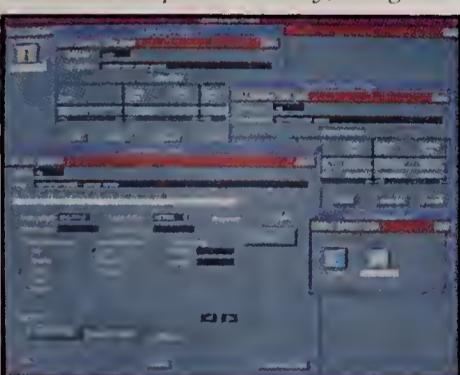
Call 1-800 CALL CAI

today for a free Demo Disk and complete information on how we're making the world safe for UNIX.

And how our new CA-UNICENTER can make UNIX safe for you.



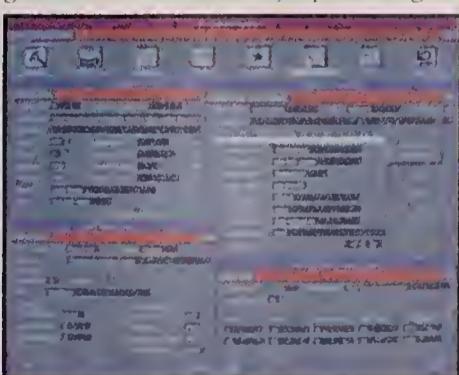
CA-UNICENTER provides Security, Storage Management, Problem Management, Resource Accounting, Console Automation, Print/Report Management, Scheduling and Workload Balancing Solutions.



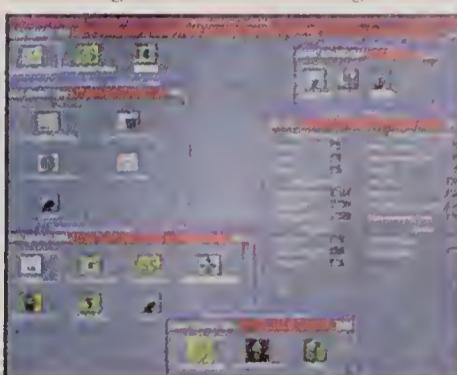
Security Control gives you single-point control for the entire system. It provides the first and only method for limiting authority of superusers.



Storage Management ensures files are backed up and archived. Frees space when file systems become full and keeps backup and archived files safe from accidental or intentional destruction.



Help Desk includes Machine Generated Problem Tracking and Priority Escalation—so people are immediately notified of critical problems.



Resource Accounting lets you customize billing any way you want so the right bill has the right information and goes to the right group.

**COMPUTER  
ASSOCIATES**  
Software superior by design.

# Sun, HP rev workstation engines

Sun takes on enterprise computing for commercial sites, while HP secures technical markets

By Maryfran Johnson

**Pitching their workstation wares to markedly different customers, Sun Microsystems, Inc. and Hewlett-Packard Co. last week unveiled a lineup of systems, software and services designed to appeal to both commercial and technical users.**

Sun made a beeline for commercial sites with its mainframe-class SPARCcenter 2000 multiprocessors and SPARCclassic color workstations, while HP held firmly to its leading position in raw CPU and graphics performance with five new models of the HP 9000 Series 700 line.

"Sun is positioning itself as an enterprise computing vendor, and there is a shift of engineering and technical markets toward HP," said Robert Herwick, an analyst at Ham-

brecht & Quist, Inc. in San Francisco.

Sun said it hopes to displace PCs from commercial desktops, and HP is concentrating on the midrange and high-end workstation user.

#### Mix and match

Citibank NA's treasury risk management division is expanding use of both vendors' workstation lines, according to John Martino, vice president of software development.

"We bought HP machines for our division because it satisfied a need for performance," Martino said. "Sun has satisfied other needs in other parts of the corporation."

From the vantage point of one of Sun's premier commercial customers — Wells Fargo Bank in San Francisco — the announcement last week "reflects the kind of things we've been asking for," said Roy Camblin, senior vice president of

Wholesale Services at the bank.

Along with the low-end color SPARCclassic and the data center system, Sun introduced the SPARCstation LX, an accelerated graphics workstation priced at \$7,995 that is slated to be available next month.

The vendor also set up Sunintegration Services to assist customers in planning technology migrations, and it will offer its "SunService 2000" support package for SPARCcenter 2000 customers.

Yet Sun's strategy of pushing the SPARCclassic as a replacement for high-end PCs may be anchored more in wishful thinking than reality, some users and analysts suggested. They noted how market research shows no signs of high-end PC users migrating to Unix.

#### Coattail effect

On the HP side, the sheer technical appeal of the new Series 700 models

is likely to solidify its reputation in commercial markets as well.

"HP's technical improvements seem to coincide with a number of our requirements," said Ed Reedy, manager of information management technologies at GTE Telephone Operations, Inc. in Tampa, Fla.

With its new Precision Architecture-RISC 7100 chip, HP cranked up the clock rate of the new systems by 50% and dropped the price of its entry-level color workstation by 26%.

HP improved its three-dimensional graphics performance and is offering 3D solids workstations priced from \$7,795.

Also new is the HP MPower software, a single product that integrates multimedia capabilities into the HP Visual User Environment. Available in February 1993, it is priced at \$495 per client and \$1,495 for server software.

#### At a glance

**Five new workstations** in the HP/Apollo 9000 Series 700 are based on the PA-RISC 7100 chip. Systems are scheduled to ship in February and are priced from \$4,995 (gray-scale, diskless) to \$72,995 for a color system.

**Sun SPARCcenter 2000:** an expandable, high-end Unix server. Pricing begins at \$95,000, with two- to eight-way processor systems available in mid-1993.

**SPARCclassic:** the least-expensive color workstation on the market today, is priced at \$3,995 when purchased in quantities of 12.

## CW revamps design, production system

This week's issue of *Computerworld* features a number of changes that have been several months in the making. The most obvious of these is our new look — the result of a complete overhaul of our publication design and one that is intended to make the information in our stories more accessible and quicker to read and digest.

The redesign process began a year ago when, using focus groups, surveys and informal interviews, we collected data from our readers. This data revealed a great deal about changing habits and helped us lay the foundation for a redesign.

We selected award-winning Boston designer Ronn Campisi as our design consultant.

Paralleling this redesign effort has been an overhaul of our computer systems. We have moved from a proprietary, minicomputer-based editing system to the world of client/server computing, with all editing and page makeup functions driven by workstations and high-performance PCs.

The system was installed by Atex, Inc. in Billerica, Mass. Our information systems director, Linda Nelson, and her team oversaw the installation (see story page 92) while the redesign and systems coordination was marshaled by Catherine Gagnon, chief copy editor, and the entire *Computerworld* copy desk.

"These people quite literally sacrificed their personal lives for the last several months," said Bill Lauberis, editor in chief.

Additionally, *Computerworld* has reduced its trim size to fit better in a briefcase. And we have upgraded our paper stock significantly.

## Vital satisfies Mac users

By James Daly  
NEW ORLEANS

Apple Computer, Inc. customers starved for information about how to handle the wrenching job of moving to a client/server environment are eating up Apple's Vital document, an internally developed design for integrating the Macintosh into mixed hardware and software configurations.

Eight months after its release, Virtually Integrated Technical Architecture Lifecycle (Vital) was on the minds and lips of many of the several hundred attendees at last week's MacLS user meeting.

**Much to consider**  
Macintosh users said they are digesting the 1,000-page document in two ways: in nibbles and in gulps.

"We're using the smorgasbord approach, taking a little bit here and a little bit there, to help us get through the tough spots," said Craig Ellerbroek, director of

research and technology planning at Martin Marietta Corp.'s information services division in Orlando, Fla.

Others see Vital as welcome ammunition for confronting an issue they long have avoided — integrating desktop computers into an enterprise-wide

people to think about something they'd rather not."

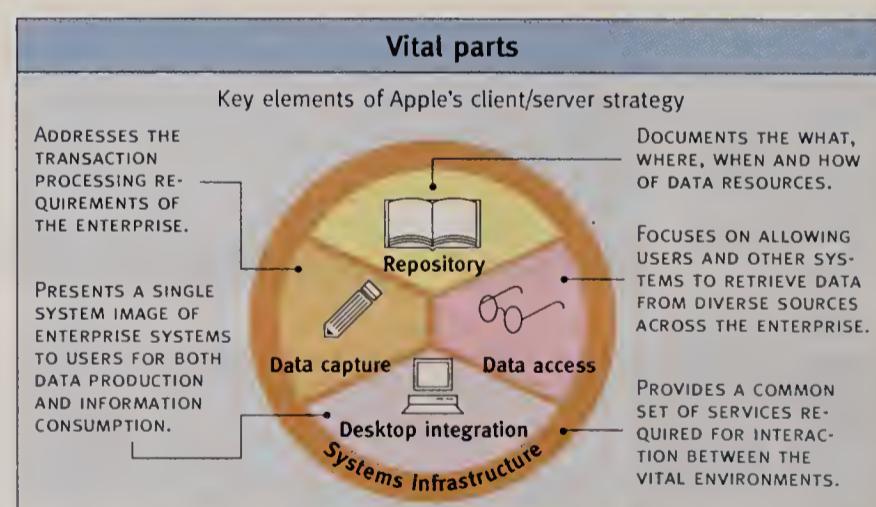
Experts say such a plan is critical. "Infrastructure is the name of the game," said John Zachman, president of Zachman International, Inc., a consulting firm in La Canada, Calif. "A solid, well-de-

veloped client/server plan, the firm's first dedicated Macintosh server, is expected to ship during the first half of 1993.

**Position decision**  
Although Apple's high-end Quadra Macintosh certainly had the power to work as a server, Apple never positioned it as such and added the functionality expected in a general-purpose machine.

As a result, users rarely considered the Quadra as a server. "The Quadra is nice, but what they need to do is get rid of some of the frills and give us a multiprocessing device with high I/O that we can dedicate to just communications or database functions," said Brian Comnes, manager of the information center at DHL Airways, Inc. in Redwood City, Calif.

Analysts said the absence of a dedicated server has hurt Apple's corporate sales, adding that until Apple gets a product out, it risks falling further behind companies such as IBM, Digital Equipment Corp. and Compaq Computer Corp.



Source: Apple Computer, Inc.

client/server design.

"A lot of folks have been scared off about going to a client/server setup because there was no one there to show them how," said David Lustig, manager of technical services at Bose Corp. in Framingham, Mass. "Apple is forcing many

signed infrastructure is the only way management has to change their entire environment."

Vital suggests replacing traditional host-down methods of integrating disparate architectures with one that begins at the desktop. It also does not re-

quire users to entirely redevelop systems already in place. Rather, it says that dissimilar systems can be bridged at the desktop using application programming interfaces available in Apple's Data Access Language and Data Access Manager.

Apple hopes Vital will grease Apple's drive to place the Macintosh into corporations. Rather than having to buy and build new systems, an organization can make existing systems work harder.

Meanwhile, a key ingredient in Apple's cli-

# SYBASE

90 LINES OF  
COMPLEX CODE

```

/* reset the counter for build of third table */
se CREATE PROCEDURE la_qty
wh /* for use on WESTCOAST server */
be

/* returns count for one part only */
@partno char(6),
@la_count int output
AS
SELECT @la_count =
(SELECT qty FROM la_parts
WHERE partno = @partno)

DECLARE @cnt int
DECLARE @counter int
DECLARE @la_count int
DECLARE @partno char(6)
SELECT @cnt = COUNT(partno) FROM ny_parts
en /* ny_parts is the parts master; need count
for sequential comparison with la_parts
to simulate a distributed join */
/*
SELECT @counter = 0

/* create temporary table for part numbers
and quantities from ny_parts */
CREATE TABLE #allparts1
(partno char(6) NULL,
ny_qty int null)
se
se
EX /* create temporary table for row numbers
@p for sequential call of la stored procedure */
@l CREATE TABLE #allparts2
up (seq int)
s

/* create temporary table for
en sequential build from first two temp tables */
CREATE TABLE #allparts3
(partno char(6) NULL,
ny_qty int null,
la_qty int null,
seq int)

/* build sequence numbers for each ny row */
while @counter < @cnt
begin
  select @counter = @counter + 1
  insert into # all parts 2 (seq) values ( @ counter )
end

/* populate temp table with ny parts and quantities */
insert into #allparts1 (partno, ny_qty)
select ny_parts.partno, ny_parts.qty from ny_parts
  
```

# ORACLE7

3 LINES OF INDUSTRY  
STANDARD SQL

```

SELECT NY_QTY, LA_QTY
FROM NY_PARTS, LA_PARTS
WHERE NY_PARTNO = LA_PARTNO;
  
```

These two programs do exactly the same thing: retrieve data from multiple servers. Oracle does it with a single 3 line industry standard SQL query. Sybase requires 90 lines of complex code. If productivity is important to you, call 1-800-633-1071 Ext. 8185 for a free copy of "Client/Server Database: Getting it Right" by programmer productivity expert Steve Schur.

\*Program code independently written and tested.

ORACLE

## News Shorts

**Runtagh is new GE CIO**

Hellene Runtagh, president of Rockville, Md.-based General Electric Information Services (GEIS), has replaced General Electric Corp. Chief Information Officer Edward Skiko. Runtagh will continue to manage GEIS as well as head GE's worldwide information systems operations. Skiko took the helm of GE's real estate, construction, distribution and corporate facilities divisions; he will also continue to head up the firm's data centers. Meanwhile, GE agreed to sell off its consulting and contract programming group, GE Consulting Services, to Keane, Inc.

**Microsoft, Intel go video**

Microsoft Corp. and Intel Corp. are making movies together. Microsoft last week unveiled Video for Windows, a software system for creating, editing and playing back digital video. The \$199 product will include software for editing and creating videos as well as a CD-ROM of video clips for incorporation into presentations. Intel announced its Indeo video technology, which it said permits "scalable performance" of digital video by allowing video quality to improve as the speed of hardware improves. Meanwhile, Apple Computer, Inc. continued its move to compete in the Windows marketplace with a version of its QuickTime multimedia technology for Windows-based PCs.

**Job cuts at BellSouth**

BellSouth Corp. announced that it will slash 8,000 jobs by 1996 because the network service industry "has become a competitive free-for-all," forcing the regulated phone company to streamline operations. A spokesman insisted the staff reductions "will not affect the pace of innovation or service rollout."

**New life for Ethernet?**

More than 200 participants — 10 times the normal attendance — showed up for last week's Institute of Electrical and Electronics Engineers, Inc. 802.3 meeting on standardizing 100M bit/sec. Ethernet. The committee is examining proposals by several vendors that hope to stave off competitive threats by non-Ethernet technologies. A follow-up meeting is planned for January.

**Informix pulls trigger**

Informix Software, Inc. last week announced availability of Version 5.01, a maintenance version of its Informix Online relational database that supports database triggers. The triggers, previously expected sometime in 1993, are fired off by client/server applications during inserts, deletes or updates to the server database.

**Candle Corp. boosts database tools**

Candle Corp. enhanced its software tools designed to optimize performance of IBM's DB2 database management system. It enhanced its DB/Explain tool for correcting the syntax of programmers' SQL queries and Omegamon II for DB2, which provides DB2 performance statistics.

**SHORT TAKES** NCR Corp. cut prices on its PCs and workstations, including a 15.5% price reduction on the NCR 3170 notebook computer and a 39% cut in the price of the Intel 486-based 3321 PC.... Epoch Systems, Inc. signed an agreement with Sun Microsystems Computer Corp. (SMCC) and Storage Technology Corp. to market Epoch's network data management software for SMCC's SPARCcenter 2000 server.... Nikkei Computer Magazine in Japan ranked Nihon Unisys Ltd. first in 16 of 17 categories of a mainframe customer satisfaction survey.

News shorts, page 16

# CA sheds tiered pricing

Vendor's flat-fee approach based on MIPS, total number of sites

By Thomas Hoffman  
NEW YORK

Computer Associates International, Inc. last week introduced new enterprise-wide pricing models that do away with the unpopular mainframe tiered-pricing approach and greatly loosen site restrictions. Analysts said the enterprise licensing schemes will be particularly attractive to large information systems shops with multiple sites.

The new scheme uses a formula that combines mainframe millions of instructions per second (MIPS) with the total number of customer sites that might use the software to come up with a single enterprise-wide price (see chart below).

The new policies are an extension of an enterprise pricing program CA introduced last April that charges fees based on the total capacity of the hardware on which the software runs, instead of on the size or numbers of CPUs [CW, April 20].

CA Chairman Charles Wang said the new format removes geographical restrictions on the use of software throughout the user's enterprise. "Sites and CPUs are replaced by aggregate MIPS," he said.

Users and analysts had mixed reactions to the initiatives. M. Lewis Temares, chief information officer

shops will shy away from the program because it requires them to adapt CA's Total Client Care program, an on-line support program. He said Total Client Care allows CA to "disable" a customer's software code if the vendor believes the software is being used improperly on unlicensed CPUs.

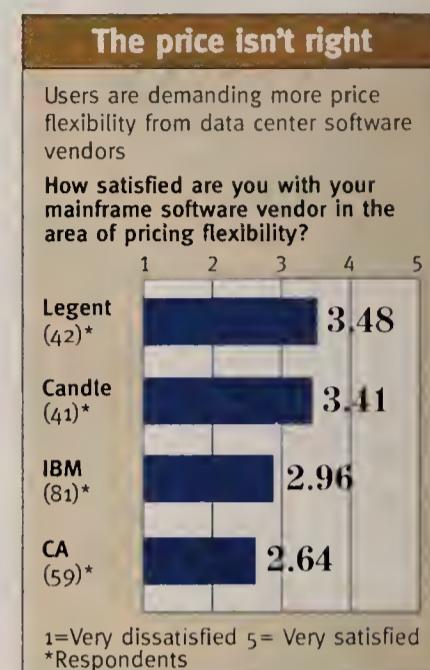
However, CA Senior Vice President Mark Combs said CA cannot disable software from headquarters, and customers under the new plan should not have to worry about licensing violations because software can be freely used across the enterprise.

**MIPS requirements**

Under enterprise pricing, users will be able to pay a flat annual fee to run software throughout the enterprise depending on a predetermined number of MIPS with a minimum of 120 MIPS for IBM MVS-based products and 60 MIPS for VSE and VM software.

CA will continue to offer its current tiered licenses and provide room for growth for users who want to migrate to the enterprise plan, said Sanjay Kumar, CA's senior vice president of planning.

CA also revised its Unix and PC product licenses and maintenance policies. Under enterprise licensing



Source: CW Database Division

However, officials from IBM and Legent Corp., which are CA's most direct competitors in data center software, said they have no plans to change their existing licensing policies.

Under its new maintenance agreements, CA is allowing its customers to pay a fixed cost for maintenance under one-, three- and five-year options.

The University of Miami expects to save \$43,000 over five years under the fixed-cost agreement it designed with CA two months ago, according to Temares.

**Paying attention**

Some users said the pricing initiatives reflect CA's increasing responsiveness to its installed base. The announcement "shows me that they are listening to the needs of their customer base in terms of flexibility and practicability, given the severe economic times we're in," said Ron Landau, vice president of MIS at CHF Industries, Inc., a Charlotte, N.C., home furnishings manufacturer.

The pricing alternatives appear to have arrived too late for one customer.

Glen Stout, systems programming manager at Bechtel Dickinson Vascular Access in Sandy, Utah, said his company abandoned the use of its CA-Datacom/DB and UCC/1 products when the firm downsized from an IBM MVS mainframe environment to an Application System/100 platform.

"We were not thrilled with their pricing policies on the MVS-based applications so we didn't even consider their products on the AS/100 side," said Stout, whose company eventually purchased AS/400-based applications from Data 3 Systems, Inc. in Santa Rosa, Calif.

How it works			
CA's Enterprise Pricing charges on the basis of aggregate MIPS across multiple sites rather than by sites and tiers			
<b>Example: Two MVS sites running CA-ACF2</b>			
CPU	Tier group	MIPS	
Site 1 IBM 3090-600J	FF	114	
Site 2 IBM 3090-200E	DD	32	
<b>Tiered pricing fee</b>		<b>\$134,424</b>	
<b>Enterprise license fee</b> (based on 150 MIPS maximum)		<b>\$129,927</b>	

CW Chart: Stephanie Faucher

at the University of Miami, said the new licensing scheme should enable the university to add new software products to its cache, including CA's TopSecret security software, which Temares said the school was unable to afford previously.

**Multiple benefits**

Mike Egan, an analyst at The Meta Group in Morgan Hill, Calif., agreed that some user shops will benefit from the expanded enterprise licensing structure, especially those that run the same software packages across multiple sites.

However, Egan said, many IS

for desktop products, CA customers can license desktop software based on the total number of PCs in the enterprise.

For example, Kumar said, a company with 250 PCs running CA-SuperProject would pay an annual fee of \$11,700 — or \$46.80 per PC — compared with a list price of \$895 per package. CA also gave its CA-Unicenter for Unix customers a pricing option based on a Transaction Processing Performance Council benchmark.

CA officials said they hoped the pricing structure would be widely adopted.

## SDLC routing snags users

CONTINUED FROM PAGE 1

as a gateway that converts the SDLC output of IBM devices into Logical Link Control — a type of packet that was designed to travel over LANs. The following are a few cases in point:

- After finding some serious bugs in a beta-test version of Cisco's SDLC-to-LLC conversion product, Pfizer, Inc. turned to SNA vendor Sync Research Corp. Pfizer also could not justify the cost of routers, so it implemented source-router bridges from Andrew Corp. to handle the LAN-to-LAN connections.

- The Travelers Corp. has backed off from initial plans to use Cisco boxes, primarily because they lacked a way to address NetBIOS devices so as to stop the broadcast storms that were eating up bandwidth. Travelers is now testing IBM and Cross-Comm Corp. routers.

- Holiday Inn Worldwide found that SNA sessions going over its Proteon routers tended to disappear when a line outage occurred or when other types of LAN traffic crowded out the SNA, said George Morales, a network analyst. The hotel chain is in the process of migrating "an extensive SDLC" network to Transmission Control Protocol/Internet Protocol (TCP/IP), which provides dynamic transparent re-routing of sessions.

Bancomer is one firm that is entrusting its SDLC to Cisco. The Mexican financial services company last week announced a huge contract under which Cisco routers will link some 10,000 nodes. However, the bank said it will have to use Sync Research boxes in combination with Cisco routers until Cisco delivers promised support of older SDLC protocols, such as half duplex, a spokesman said.

Cisco will deliver that support, along with other enhancements, within the next six to eight months, a company spokesman said. Cisco just started shipping a prioritization feature that is said to prevent other LAN traffic from bumping off SNA sessions, the spokesman added. Proteon will be introducing a similar product next month, the company said.

### Users await SDLC fix

Several users said that they expect Cisco to remedy many of its SDLC glitches, but they still question the vendor's strategy of rolling its own SNA software and putting both SNA and LAN traffic in the same box.

"I'm confident that Cisco will get its act together, but it is putting it all in one basket," said Vinnie Costa, a data communications manager at Pfizer. "We feel comfortable putting SNA-to-LLC conversion in one box, and [LAN protocols such as] TCP/IP in another, for economic, performance and network management reasons."

Recent tests by InterLab back up these concerns. An independent testing and consulting company in Seagirt, N.J., InterLab tested SDLC-to-LLC conversion software running on Cisco's M68040-based MGS router, as well as products from three SNA vendors: Sync Research, Netlink and Ring Access, Inc.

Throughput on the Cisco box was approximately 5.5K bit/sec., while the SNA vendors' products had a throughput of about 8.2K bit/sec., according to InterLab President Kevin Tolly. "Given that the test was not enough to overload anyone's box, [Cisco's performance shortcomings] must

be attributable to immature code," he said.

"We're continuously improving the code; we're not suggesting the first out is the best," the Cisco spokesman said.

Several users also questioned Cisco's decision to support IBM's NetView in only a limited fashion through a Simple Net-

work Management Protocol intermediary. They pointed out that information systems managers can go on managing SNA traffic on Sync Research and Netlink boxes, just as they always managed IBM cluster controllers, via NetView.

Robin Layland, manager of SNA software engineering at Travelers, spoke for many when he suggested that routers have not been around long enough to achieve the high level of reliability that SNA users take for granted.

**WE'RE TURNING REORGANIZATION UPSIDE DOWN**  
**...with HIGH PERFORMANCE AT LOW COST**

**FDRREORG™**

**WHY SHOULD YOU PAY MORE?**

**ALL FOR \$5,000\***

**AUTOMATION WITH SPEED**

**IEBCOPY COMPRESSION**

**VSAM REORG**

**IAM REORG**

**COMPRESS PDS'S**

**VSAM**

**IDCAMS**

**IEBCOPY**

**PDS**

**FDRREORG™ USER EXPERIENCES**

▲ Nightly VSAM reorganization reduced from 1 hour 40 minutes to 20 minutes, allowing the user to leave the on-line system available for an extra hour each night.

▲ New files added to applications automatically are eligible for reorganization. No separate IDCAMS REPRO JOB required for each new VSAM file added.

▲ More consistent performance from our CICS system that is a heavy user of VSAM KSDS files. FDRREORG automatically identifies those files with excessive CI/CA splits and reorganizes them. Files are now only reorganized when there is the need.

▲ Simulation feature allows you to identify those data sets in need of reorganization.

▲ FDRREORG's transparent IEBCOPY interface was very easy to install without modifications to our operating system. We just enabled the option, ran FDRSTART and our IEBCOPY compresses run 60 to 95% faster without JCL or control card modifications.

▲ FDRREORG eliminates scheduling headaches by automatically bypassing data sets in use and processing them as they become available. Optionally, FDRREORG waits for them at the end of the run.

▲ FDRREORG's subtask capability (up to 15 volumes simultaneously) allows hundreds of volumes to be processed in a short period of time.

▲ Significant reduction in staff time required to monitor and schedule VSAM reorganization and PDS compression. End user is no longer responsible or concerned about compression or reorganization.

	# DSN	ELAPSED	CPU	EXCPS
FDRCOPY	479	10.16M	16.01S	5197
DFDSS V2.5	479	164.39M	382.86S	447203
SAVINGS		93.8%	95.8%	98.8%

User compressed 479 data sets using FDRCOPY REORG as compared to DF/DSS (executing IEBCOPY). Data sets occupied 33585 tracks on a 3090-400s using MVS/ESA.

**Call for a  
FREE No Obligation  
90 Day Trial  
And A Cup**

**INNOVATION  
DATA PROCESSING®**

**CORPORATE HEADQUARTERS:** 275 Paterson Avenue, Little Falls, New Jersey 07424 • (201) 890-7300

**EUROPEAN OFFICES:** FRANCE 01-47-69-15-15 GERMANY 089-439-2053 NETHERLANDS 036-534-1660 UNITED KINGDOM 081-905-1266 NORDIC COUNTRIES +31-36-534-1660

**INNOVATION DATA PROCESSING 20th ANNIVERSARY**

# EMC ups mainframe storage ante

By Kim S. Nash  
HOPKINTON, MASS.

EMC Corp. unveiled a new mainframe storage system last week, just one day after Storage Technology Corp. was forced to announce that shipment of its rival Iceberg has been delayed for the fourth time.

EMC's Symmetrix 5500, which is cur-

rently in beta testing at five sites, contains several key features touted in Iceberg, a redundant arrays of inexpensive disks (RAID) subsystem. Plus, the EMC product is said to outperform IBM's latest high-end offerings. That is turning users' heads.

Symmetrix 5500 — due out first-quarter 1993 — faces a receptive user audience. General Accident Insurance Company of

America in Philadelphia, plans to replace 180G bytes of IBM storage systems with a Symmetrix 5500 it has beta-tested for several weeks. The EMC system is smaller than the comparable IBM offering, requires less cooling and manages data better, according to Alan Pomerantz, vice president of technical services.

"I got nothing from IBM that I couldn't

have from EMC for less [money]," Pomerantz said. The insurer figures it will save \$2.50 per megabyte of storage space, plus the cost of adding air conditioning and other data center accommodations required by IBM's comparable product, the 3990/3390.

"EMC is now able to compete seriously in the very high-end market," said David Vellante, an analyst at International Data Corp. in Framingham, Mass. The product can perform several RAID-style functions, such as disk mirroring and dynamic sparing, which automatically reallocates data to a spare disk should a predefined level of disk errors be reached. These features give EMC increased leverage in large accounts such as brokerage firms and hotels, which require continuous data availability.

Pershing, Inc., a brokerage firm in Jersey City, N.J., is a pure IBM shop, running an IBM Enterprise System/9000 Model 700 mainframe and an all-IBM storage setup. Symmetrix 5500's functionality and price are interesting, said Bruce Bordonaro, systems software manager.

Bordonaro said he wanted to price-shop storage systems to "at least keep IBM on their toes." He acknowledged, though, that Pershing likes to stick with the tried and true and may not want to take a chance on EMC, which is just building a reputation in the glass house.

Storage Tek attributed snags in delivering its RAID offering to continuing software integration problems (see chart). Iceberg, first announced in January, will not be out until late 1993. As a result, the company's stock took a pasting, tumbling \$8.13 last Tuesday to \$23.63. It later recovered 57 points to close late last week at \$29.50.

## Melting Iceberg

Though Storage Tek was the first to announce a mainframe RAID, its lead has evaporated as the product's delivery schedule has slipped.

**January:** Iceberg announced, beta testing to begin by second quarter, production to follow late this year.

**April:** External beta testing pushed back to third-quarter 1992. Storage Tek maintains it will sell \$50 million worth of Iceberg by year's end.

**May:** Production shipments rescheduled for fourth-quarter 1992.

**August:** Beta testing rescheduled for late 1992.

**November:** Continuing software integration problems forces yet another delay.

# "CA-Realia COBOL Achieved The Highest Overall Rating"

*Computerworld Buyer's Scorecard March 25, 1991*

- ✓ Quality Of Technical Support
- ✓ Clean Code Production
- ✓ Ability To Increase Programmer Productivity
- ✓ Responsiveness Of Vendor Service
- ✓ Speed
- ✓ Overall Ease Of Use
- ✓ Training Required To Use Product
- ✓ Costs vs Benefits Provided By Product
- ✓ Ease Of Installation

We won.

That's what the most recent Computerworld Buyer's Scorecard of COBOL software said: CA-Realia COBOL is the highest-rated COBOL solution available.

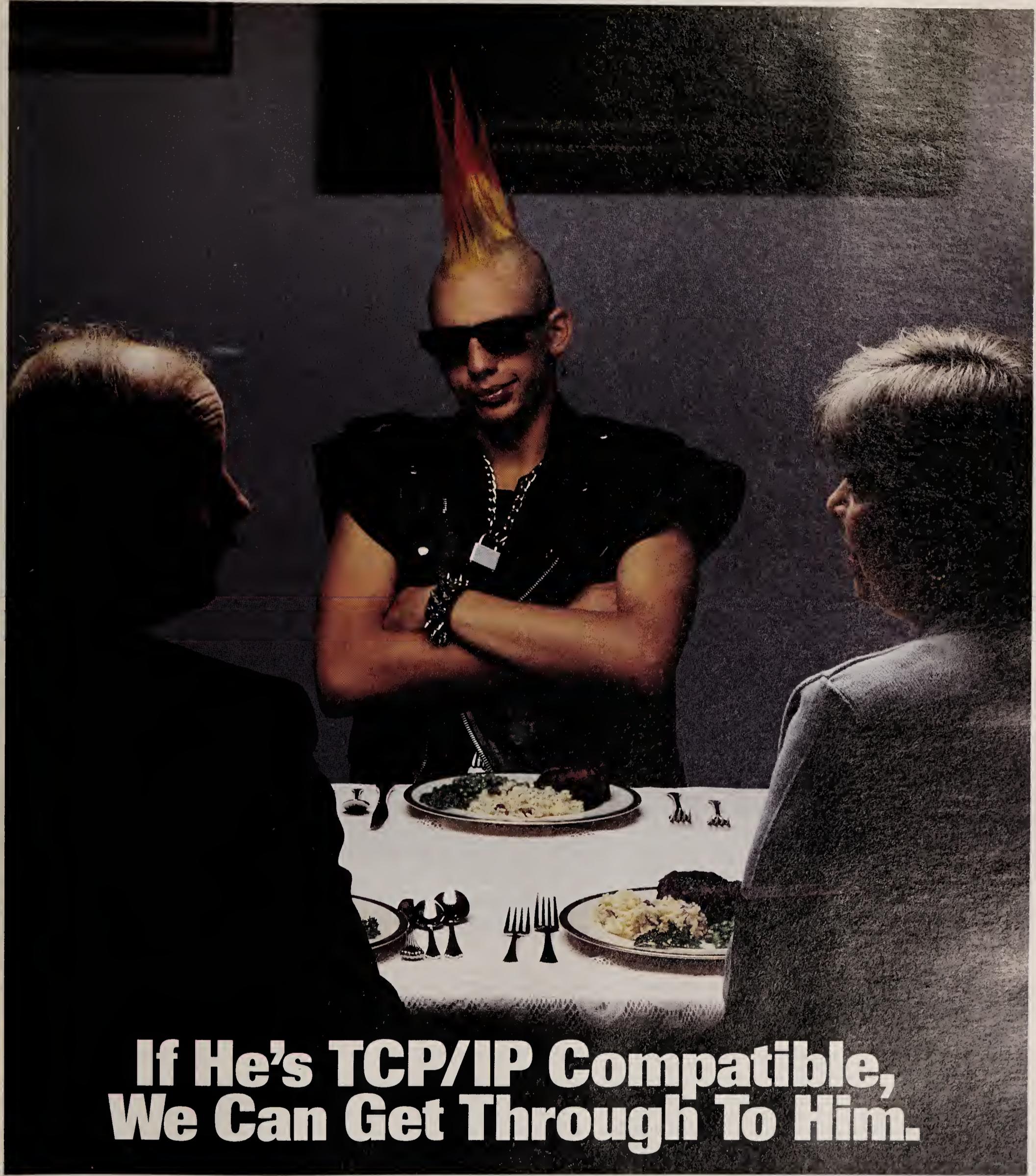
Not Micro Focus. Or RM/COBOL. In fact, no other COBOL software could match CA-Realia COBOL's overall ease of use and technical superiority in compiling and debugging large system applications.

But you be the judge.

Call 1-800-CALL CAI today for more information on CA-Realia COBOL and the scorecard article.

With COBOL software this good, you win.

**COMPUTER ASSOCIATES**  
Software superior by design.



**If He's TCP/IP Compatible,  
We Can Get Through To Him.**

With Cisco routers, no communications challenge is too tough. From TCP/IP to OSI. From AppleTalk to DECnet. From across the room to across the world. We'll get any communication protocols talking. And our flexible, software-based technology will help you relate to future generations too. Call 1-800-859-2726, and let's talk. You'll have no problem getting through to us.



# Layoffs may impact Travelers IS

Continuing cutbacks won't affect projects that have immediate payback

By Nell Margolis  
HARTFORD, CONN.

Plans to slash 5,000 jobs at The Travelers Corp. during the next two years could take a large chunk out of the insurance giant's 3,213-member information systems ranks, according to two sources highly placed in the company.

But Travelers executives and industry observers said the firm is even more committed to boosting IS' role in its business mix.

Earlier this fall, the quest for efficiencies and economies in the face of industrywide competition and nationwide recession led \$11.4 million Travelers to put 3,500 jobs on the chopping block. Two weeks ago, it upped that number by 1,500.

Travelers, which has been battling effects of the lingering nationwide recession and a stressed insurance market for months, announced the new round of cuts as it posted its second-ever quarterly loss. However, Chairman Edward Budd assured employees that neither the loss nor an impending equity alliance with New York-based conglomerate Primerica, Inc. spurred the reductions.

## Tight times

Between year-end 1989 and year-end 1991, Travelers saw an approximate 9.6% work-force reduction, from an estimated 37,200 employees to 33,600. Two rounds of layoff announcements in the past several months promise to chop an additional 5,000 staffers from the rolls. Widely regarded as a company in the IS vanguard, Travelers runs on \$127 million worth of computers, not including an estimated 42,800 PCs.

According to one IS employee who requested anonymity, the 1,500-employee reduction is largely aimed at the corporate staff, which includes the lion's share of the firm's 3,213 IS professionals.

A Travelers IS executive who also asked not to be identified speculated that "data center, telecommunications and workgroup support people are going to be highly affected."

Reiterating Travelers' policy of refusing to comment on rumor and speculation, a company spokesman said that it is "way, way too early to tell" what toll the cuts will take on any specific group within the firm.

But wherever the ax falls, "IS initiatives with real payback to the company won't be altered," Chief Information Officer Lawrence Bacon said. That could include most IS projects currently afoot at Travelers, he added, because "we've made sure over the past couple of years that everything we're doing is specifically aligned to a business goal."

Theoretically, attractive technologies without immediate business payback have been quietly shelved, Bacon said. They include the following:

- Pilot imaging projects in the managed-care arena and pensions. "There are a great number of things we need to do before we can get the most out of imaging," Bacon said. High on the list for further exploration are advances in electronic data interchange and increased reliance on rapid application development methodology.

- Expert-systems technology. "It's interesting," Bacon said, "but we ended up saying, 'Hey, wait a second—who's using this stuff?'"



**Larry Bacon:** Travelers' IS has made sure to align its projects to a business goal

Ann Purr, manager of information management resources at Atlanta-based insurance industry association Loma, noted that Travelers has long been hailed as a firm in the IS vanguard. Wherever the coming layoffs occur, she said, "I'd be surprised if the company's emphasis on IT diminished."

## McCaw to replace outsourced hosts with Next-supplied servers, software

By Mark Halper  
KIRKLAND, WASH.

Just one week after receiving a promise of a \$3.8 billion equity infusion from AT&T, McCaw Cellular Communications disclosed last week that it will replace its outsourced mainframes with in-house Unix servers tied to some 3,000 desktops running Next, Inc.'s operating system.

The move marks an effort by the nation's largest cellular carrier to improve customer support, billing and other operations, in part by moving from a slow batch process.

Nonetheless, McCaw last month renewed its Cincinnati Bell Information Systems, Inc. (CBIS) mainframe outsourcing contract in a retroactive three-year pact that extends through 1994, giving the company time to bring the in-house system on-line.

McCaw Chief Information Officer Ingvar Petursson said he may retain CBIS for software development and invoice processing but will put raw processing on the Unix system.

McCaw has enlisted object-oriented development help from Andersen Consulting as it readies a real-time scheme of Unix servers and databases at some 60 McCaw



**Ingvar Petursson:**  
McCaw is satisfied with CBIS

sites. McCaw's sales and customer service representatives will tie into the system through Next's NextStep operating system running on 486 PCs or Next workstations, according to Petursson.

Petursson said McCaw has been satisfied with the CBIS relationship, and CBIS may participate in developing billing software for the forthcoming McCaw system, called Axys.

McCaw may also tap CBIS for selective outsourcing tasks, such as printing customer bills.

McCaw's design calls for installing Unix servers loaded with rates and billing data at its 40 call-switching sites. The servers would tie directly to the switches and keep up-to-the-minute accounts of customer activity. These servers would

also tie into another 20 Unix servers housing customer databases installed at McCaw business offices to provide instant updates of customer records and immediate response to customer requests.

McCaw plans to implement Axys in two stages. The customer databases will begin to come on-line in January, and the rates and billing systems will go live in 1994, Petursson said.

He declined to estimate capital expenditures for the Axys system.

## MCI makes wireless pitch

By Joanie M. Wexler  
WASHINGTON, D.C.

MCI Communications Corp. last week proposed that the Federal Communications Commission (FCC) allocate radio spectrum for building nationwide, wireless personal communications networks (PCN) to consortia rather than to individual firms.

MCI's filing, with an eye toward wireless PCN service by early 1994, rounded out moves by roughly 150 companies that have responded to the FCC with advice on how the industry should build next-generation, wireless voice/data networks supporting nomadic users. MCI's proposal includes allocating a spectrum license in the 2-GHz frequency range to each of three carrier teams.

PCNs will eventually allow users with specially designed voice/data devices to roam the globe with one personal "phone number." This should allow firms to better leverage far-flung expertise and to minimize phone service costs by eliminating the installation of multiple lines for traveling employees, users said.

However, they said, the service's appeal hinges on the dynamics of how issues such as tariff costs and the breadth of network reach play out.

"The key is how these networks will be regulated, what kind of tariffs we're looking at and whether they will really be nationwide, rather than focused on major metropolitan areas," said Robert H. Hamilton, president of the Tele-Communications Association (TCA) user group.

"Many members of TCA are not necessarily headquartered in or have facilities in metropolitan areas," Hamilton explained.

Wireless packet data networks from RAM Mo-

bile Data and Ardis, a joint venture between IBM and Motorola, Inc., "are limited in scope as to where subscribers can receive signals," agreed Phillip Evans, director of telecommunications at Perot Systems Corp. in Dallas.

"But this is partly a resource problem that could be addressed by spreading capital investments" across several consortia, he said.

Jane Videtich, president of user group International Communications Association, said, "I don't think one company should have a lock on the available spectrum. This works against competition."

**What a deal**  
The portable voice/data devices that roaming users will carry to hook into an MCI-managed PCN will cost about \$70, according to MCI. Users said the price is "extremely reasonable."

MCI competitors Sprint Corp. and AT&T do not support the consortia approach. AT&T suggested the FCC allocate 20 MHz of spectrum to five competitors in each nationwide market rather than to the three licensees it is considering. Sprint has recommended the FCC allocate at least 30 MHz per license to three licensees and allow noncontrolling minority interests of up to 30%.

Such issues must be resolved before users can think ahead to the potential benefits: A PCN should allow, for example,

"a company to tap into talent throughout its personnel base. It gives you that freedom of movement and accessibility to the people who have the knowledge necessary to make quick, informed decisions," Evans said.

Steve Zecola, vice president of personal communications services at MCI, said it will take \$5 billion to \$10 billion to build the technology nationwide, and by the year 2000, "there will be 70 million users generating \$40 billion in revenue. In listening to president-elect Bill Clinton that capital formulation and job creation are the highest priority, we can't think of anything that would do that more quickly than PCN."

# You've Never Seen 370 Assembler Programs Like This Before.

And you'll never look at your IBM® Basic Assembler Language applications the same again, thanks to Micro Focus 370 Assembler with ANIMATOR/370.™

Micro Focus 370 Assembler lets mainframe programmers use a PC to support standalone Assembler programs or COBOL programs containing dynamic CALLs to Assembler. Now, with ANIMATOR/370, compiling, testing and linking Assembler applications is easier and more efficient than ever.

ANIMATOR/370 is a full-screen, source-oriented analysis and interactive debugging facility that gives programmers a three-dimensional look at

their Assembler programs. You can watch a step-by-step execution of your Assembler application and see the instruction and condition code in one window, while a source-listing complete with addresses, machine code, labels and comments appears in a second window. At the same time, a third window shows 16 general purpose registers that change to show the results of executed instructions.

Micro Focus 370 Assembler with ANIMATOR/370 also offers a Probe facility that allows programmers to quickly dissect a 370 Assembler instruction. All screen dumps can be displayed in one or two windows with new DUMP

utilities and a complete list of 370 Assembler instructions (sorted by mnemonic code) is included in ANIMATOR/370's new online reference system. In addition, a built-in hex adder/converter allows for quick calculation of index/base/displacement addresses or adding other hex values.

Call 800-872-6265 and learn how Micro Focus 370 Assembler with ANIMATOR/370 will change the way you look at Assembler applications and discover "A Better Way of Programming."<sup>TM</sup>

**MICRO FOCUS**

Micro Focus is a registered trademark and 370 Assembler with ANIMATOR/370 and "A Better Way of Programming" are trademarks of Micro Focus. All other trademarks are property of their respective companies.

GSA Contract Number GS00K90AGS5251-PS02.

# Standards challenge

Microsoft's connectivity API no longer only one on block

By Jean S. Bozman  
LAS VEGAS

This week's Comdex/Fall '92 attendees will witness the latest schism in the client/server market: A consortium of vendors, including IBM, Borland International, Inc., Novell, Inc. and WordPerfect Corp., will begin challenging Microsoft Corp.'s emerging standard for database connectivity.

The new kid on the database block — Integrated Database Appli-

## At a glance

**Major vendors** lined up behind IDAPI are IBM, Borland, Novell and WordPerfect.

**Microsoft** lists 30 vendors as supporting its ODBC interface for Windows.

cation Programming Interface (IDAPI) — is a variation of Borland's ODBC interface for its own databases: Paradox, dBase and Interbase. Now Borland's creation is being offered as an alternative to Microsoft's Open Database Connectivity (ODBC) Windows interface.

With IDAPI, programmers can write to a single interface, which in turn can address both SQL relational databases and flat-file databases such as Borland's dBase and Novell's Btrieve, said Rob Dickerson,

vice president of Borland's Paradox business unit. "I think we figured if we didn't support the industry standards bodies, we'd get kicked."

The first wave of IDAPI environments are DOS, Windows, OS/2 and NetWare.

Industry analysts said the IDAPI backers are pushing their standard because they were wary of Microsoft's domination of an API standard.

"With Microsoft's Access database coming out, people are afraid that Microsoft will control the database access standards," said Richard Finkelstein, president of Performance Computing, Inc. in Chicago.

Microsoft was brought up short by the IDAPI move. "Our view of IDAPI is we'd like to see it," said Mary Eng-

strom, group manager of Microsoft's Database Products Group, which is shipping Access this week.

She also said ODBC could support both SQL databases such as the Microsoft/Sybase, Inc. SQL Server or flat-file databases.

However, Borland said IDAPI would soon be available to software vendors and that ODBC applications would work with it.

"Drivers that support ODBC will be able to take advantage of IDAPI without modification," said Mid Walsh, director of strategic partnerships at Novell. "It simplifies the task of writing and maintaining multiplatform applications for developers and allows users to access many data sources across their enterprise."

# First fruits of Microsoft database strategy ready

By Jean S. Bozman  
LAS VEGAS

Microsoft Corp. is slated to announce this week a development framework for desktop database applications in the form of its Access database and a companion graphical user interface-based Windows tool kit.

Both products, which grew out of Microsoft's Cirrus project, will be unveiled here this week at Comdex/Fall '92, the company said.

Comdex attendees will also view FoxPro 2.5, an enhanced version of

the fast Xbase database Microsoft gained through the June acquisition of Fox Software, Inc.

Microsoft, which tested Access for nearly a year at more than 4,000 beta-test sites, said Access can be used by business managers and Windows users to craft the sort of database applications heretofore available only from information systems programmers.

For example, guided by prompts, on-screen Help and preprogrammed "macros," end users can set up database tables and create database reports.

Access is capable of creating relational database management system tables and making SQL queries to other DBMSs, said Mary Engstrom, manager of Microsoft's Database Products group.

Among the outside DBMSs supported in the first release are Borland International, Inc.'s Paradox and dBase and Novell, Inc.'s Btrieve.

Access is priced at \$99 until January, when the price will be \$700.

One beta-test user said he has already created several Access applications. "I'm the kind of developer who uses abstract, high-end tools," said Bill Serrahn, president of WorkGroup Solutions in Seattle.

With little Windows programming experience, he said, he began using Access 11 months ago. "It has the capability to do very complex things," he said.

prove that it can compete profitably in the PC market and needs a successful low-end product to remain a broad supplier.

"One thing that will determine how well IBM does [as a company] is whether they can get into supply before Compaq does," Tauscher said. "Compaq should have been back in supply by now, and they're not."

Tauscher thinks IBM can stem the flow of customers looking at Compaq and claim substantial portions of Compaq's order backlog if it can deliver its ValuePoint line.

It will be an uphill battle, however. Computer Intelligence's user surveys show that Compaq actually caught up to IBM in terms of planned PC purchases in the months after the Houston-based PC maker introduced the Prolinea, DeskPro/I and Contura product lines.

"The battle is going to be won on availability, and I'm beginning to see that IBM cannot ship [ValuePoint 486s] in quantity this quarter," said Matt Fitzsimmons, who runs a ComputerLand dealership in White Plains, N.Y.

# IBM gives unit freedom

CONTINUED FROM PAGE 1

product delivery.

"If this is getting them more focused to better understand and provide what the customers really need, then that will be beneficial to everybody," said Robert Hecht, vice president of investment systems at Prudential Investment Corp.

IBM's first public display of this intent comes this week at Comdex/Fall '92 in Las Vegas, where the vendor will showcase the business under its new name, the Personal Software Products group, which replaces the former label, the Personal Systems Programming group. The Personal Software Products group is responsible for OS/2, DOS and associated operating system products such as multimedia development.

In an interview last week, John Patrick, vice president of sales and marketing for the Personal Software Products group, described the unit as an "independent stand-alone business that's totally focused on the operating systems software business." A spokesman said Patrick did not mean to imply a spin-off plan is on the table, adding, "The plan is to move toward the PC company as a model. If it makes sense and the time is right, we will do the same thing on the software side."

## At a glance

**December 1991:** Personal Systems line of business receives go-ahead to reorganize. It includes the Entry Systems Division and Programming Systems Division.

**September 1992:** IBM Personal Computer Co. is formed from Entry Systems Division. Marketing and distribution from National Distribution Division are rolled in. Programming Systems Division also receives some NDD responsibilities.

**November 1992:** Programming Systems is renamed Personal Software Products group.

James Cannavino, an IBM vice president and general manager of the Personal Systems line of business, has been directing a reorganization since early this year to give each of the Personal Systems units more independence. Meanwhile, the operating system software unit was granted more responsibility in September. It received worldwide marketing strategy responsibility and owns all U.S. marketing execution and distribution. Unlike its hardware counterpart, it shares profit-and-loss responsibility with the holding company.

Industry analysts said they suspect IBM will want to watch how the IBM Personal Computer Co. fares before letting go of the desktop software business. It is more likely eyeing OS/2's progress and would spin off the software group once it believes the operating system can sustain 1992 shipment levels.

OS/2 is not yet a profitable piece of business for IBM, according to a statement made last month by John Soyring, Personal Systems director of software development programs.

# PCs in short supply

CONTINUED FROM PAGE 1

Life Insurance Co.

Compaq, meanwhile, has caught up with current demand for its Prolinea and DeskPro/I low-priced lines but has made little headway into what reseller executives said was a 200,000-unit backlog.

Meanwhile, the third member of the Big Three — Apple Computer, Inc. — is backlogged through the first quarter of 1993 with its hugely successful PowerBook and PowerBook Duo notebook lines, and it has spot shortages of up to two weeks on its high-end Quadra 950 line, an Apple spokeswoman confirmed.

"Our backlogs [with the Big Three] are worse than they've ever been in the history of our business," Tauscher said.

Other dealers agreed, expressing concern about their ability to keep customers happy if they cannot deliver product.

The problem, said Seymour Merlin, publisher of "The Channel

marker," a Palo Alto, Calif., newsletter, is that the Big Three "were all too conservative to figure out that demand was going to be so high, and they kind of 'stuffed' themselves."

The Big Three cannot in some cases provide simple components such as hard drives and monitors in the quantities they need to meet massive demand driven by lower priced machines and innovative products.

## On its own

IBM has the most potential to escape this problem because it can make most of its own components, including processors. But it also has the most to lose if it fails. Most analysts said they feel that Compaq's three-month jump into the low end of the market gives it a solid footing, and that Apple's problems involve unique products, making it unlikely that customers will shift vendors.

IBM, meanwhile, is struggling to

# The Editors were unbiased, objective, impartial, and impressed.



## ► EDITORS' CHOICE

### • Sybase SQL Server for NetWare

For its state-of-the-art feature set and blinding speed, Sybase SQL Server for NetWare wins our Editors' Choice. The product supports on-line backup, stored procedures with control logic, server-based referential integrity through triggers, and more.

support is relatively light, SQLBase is a good choice for companies without an existing database.

(for more information, see "Database Tuning," p. 102) and the other products are available from Sybase, Inc. Sybase's SQL Server for NetWare is the top-rated database, beating 6 other products, including Oracle Server for NetWare.

As the editors said, "Sybase delivers the goods: stunning speed, a state-of-the-art feature set, and massive front-end vendor support."

SYBASE SQL Server is also available for leading UNIX and VMS operating systems.

SQL Server for OS/2 is available from Microsoft® and Sybase.

To find out more, call 1-800-8-SYBASE.



**SYBASE**

© 1992 Sybase, Inc. SYBASE SQL Server is a trademark of Sybase, Inc. Other trademarks or registered trademarks are the property of their respective holders.

Server NLM earns an honorable mention. Though it lacks some of SQL

companies with databases on many platforms, and Novell's NetWare SQL is especially well suited for companies

# Revised CC:Mail debuts

By Lynda Radosevich  
CAMBRIDGE, MASS.

Lotus Development Corp. will introduce today at Comdex/Fall '92 an overhauled version of CC:Mail for IBM's OS/2 2.0 that can be used as an integrated component of the Workplace Shell, the company said.

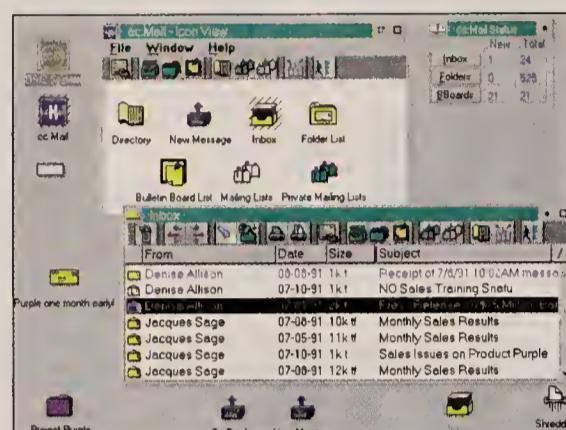
Lotus said pricing would be available when the software ships in early 1993. It is evaluating offering a free upgrade to CC:Mail for OS/2 1.3 users.

IBM will resell the product, and while it said the move is not a direct response to Microsoft Corp.'s Windows for Workgroups, CC:Mail will boost its workgroup product line.

## Most relevant

"It is probably more relevant to the hardcore MIS operations than Windows for Workgroups. There is no question that OS/2's real strength is in communications-intensive applications," said Jeffrey Tarter, editor and publisher of "Softletter," an industry newsletter.

CC:Mail for OS/2 Workplace Shell has been redesigned to be an integrated part of the Workplace Shell and to function like another icon on



CC:Mail for OS/2 can now be used as an integrated component of the Workplace Shell

the desktop. According to IBM, it is the first 32-bit electronic-mail package for OS/2. Unlike the previous 16-bit version of CC:Mail for OS/2, the program uses OS/2 2.0's object-oriented file management, drag-and-drop and multitasking features.

The program lets users automatically attach files to CC:Mail messages by dragging and dropping the file's icon into the message.

Other features include Boolean searching, mail enabling of any OS/2 file and quick addressing that calls up a complete address when a user types the first letters of a recipient's name. An undocumented feature will allow programmers to use OS/2's programming language to write rules-based processing programs for automatic mail routing, according to Lotus. The interface includes Lotus' SmartIcons and a

Windows-like menu bar.

CC:Mail for OS/2 Workplace Shell does not support fonts, bolding, underlining or other forms of rich text, but Lotus said it plans to introduce support for rich text across the CC:Mail product line in 1993.

IBM said it is evaluating whether to package CC:Mail or Lotus' Notes with OS/2. IBM currently resells the 16-bit version of CC:Mail for OS/2.

# Lotus to show Improv

By Rosemary Cafasso  
LAS VEGAS

■ **Lotus Development Corp. will show off Improv for Windows, its next-generation spreadsheet, this week at Comdex/Fall '92 but do not expect to take a copy home with you.**

Lotus had promised to ship the software, which early users said greatly improves the management of complex financial models, by the end of 1992. It now plans to ship it in the first quarter of 1993.

This is the second minor delay in Lotus' spreadsheet business in recent months. The company had also targeted a year-end shipment for 1-2-3 for Windows Release 2.0, but it too is now scheduled for early 1993.

## Better late than never

"They are a little bit later than we'd like, but we want to take the time to ship the right product," said Jeffrey Beir, vice president of the spreadsheet division.

Improv for Windows will be positioned as a companion product to 1-2-3 and in some cases will be pitched as a 1-2-3 replacement, Beir said.

Improv for Windows will be positioned as a companion to 1-2-3

Improv delivers ease-of-use features by allowing users to input data in English. At the same time, it should appeal to power users who have hit the wall with their current spreadsheets because it removes the restrictions of conventional spreadsheets and allows multiple, different scenarios to be built from a single model.

It also allows users to make changes to a model by simply adding new data or dragging and dropping variables to a different location on the model. Either change is automatically calculated and reflected throughout the model.

And despite Improv's delay, it is scoring big with some early users. Tor-Einar Olsen, a planning coordinator at Conoco, Inc. in Houston, is using Improv after swearing off spreadsheets years ago.

"Spreadsheets are basically too hard to use and too hard to maintain because of all the cell formulas," Olsen said.

Nonetheless, Olsen had been in search of a software tool that would help him with cash-flow modeling—a big chunk of his work. Improv, he said, allows him to change things quickly.

# Hot technologies center stage at Comdex

By Michael Fitzgerald  
LAS VEGAS

Users said they want Comdex/Fall '92 to show them effective ways to turn computing's hot technologies—multimedia, mobile computing and groupware—into real-world applications. While their goal will not be in sight, they will find a well-marked path toward increased productivity.

"I hope to come back from Comdex with the ability to make some plans," said Bob Holmes, computer technology research analyst at Southern California Gas Co.

Another PC manager, who oversees 3,000 mostly IBM PCs and servers at a major New York bank, expressed interest in getting production applications on multi-processing servers and local-area networks.

The bank, which already runs Lotus Development Corp.'s Notes, is also scouting for groupware systems that can be integrated with efforts to equip bank officers with PCs.

By showcasing real implementations of these technologies, Comdex this year will fulfill some of the promise of Comdexes past. Take last year, when IBM broke its

pledge to ship OS/2 2.0, and Microsoft Corp. failed to deliver Windows 3.1. Both products had been promised by Comdex and shipped in January and late April, respectively. This year's show promises plenty of applications for both environments.

Among the eagerly awaited products that will see the light of neon at Comdex are Access, Microsoft's Windows-based relational database, and development tools for Windows NT and OS/2 (see story page 12). Borland International, Inc. plans to show C++ for OS/2 behind the scenes, as well.

Of course, those offerings are just a drop in the Comdex bucket of products. What follows is a brief tour, segmented by technology sectors, of some of what users can expect to find on display:

A slew of next-generation portables will be on display, many of them smaller than today's typical notebook. These will make use of Personal Computer Memory Card International Association (PCMCIA) cards, which will make their first major splash here this week, with up to 40 vendors showing a variety of cards.

Besides PCMCIA, the big mobile computing themes will be wireless

## Pumping up

Hardware vendors will put on some speed to boost graphics performance of the system-stopping graphical interfaces. Numerous vendors will display systems that use the Video Electronics Standards Association VL local-bus design, and while it won't be at the show, Epson America, Inc. will officially begin shipping its Progression line of PCs with the Chips and Technologies Wingine graphics accelerator inside.

IBM and Reply Corp. will offer a performance-boosting upgrade board that will allow the installed base of Personal System/2 Models 50 through 80 to move to the 386SLC and 486SLC2 chip.

technology, display and color screens. Color screens will be a staple offering, even from smaller players such as Northgate Computer Systems, Inc. and Dauphin Technology, Inc. Northgate's active-matrix ZXPortable will use a 25-MHz 1486SX and a 120M-byte hard drive for \$3,799, while Dauphin will show the GT-500C, a 386SL-based passive-matrix notebook for an impressively low \$2,395.

Pocket-size portables will proliferate, too, as will numerous smaller-than-notebooks. For instance, Zenith Data Systems will release the Z-Lite 320L, a 3.9-pound near-notebook-size PC, based on Intel Corp.'s 3.3V 80386SL.

Sharp Corp. will begin shipping a new pen-capable version of its Wizard pocket organizer. Chips and Technologies, Inc. will officially get into the OEM hardware business, displaying prototypes of its 2.3-pound MiniBook, a 10-by-6-in. product based on its PC/Chip. The San Jose, Calif.-based chip set maker has also joined with Logitech, Inc. to create a reference design for a 4-by-6-in. pen computer.

PCMCIA cards will come into their own at Comdex, thanks to a recent software standard the group set.

PCMCIA cards have fallen far short of being as system-independent as floppy disks, but the new standards are "the first major step for true [PCMCIA] interoperability," said Brendan McGwire, executive director of the PCMCIA.

The current driving force behind PCMCIA is the add-in card market, fax/modems, network adapter cards and the like, for notebook and smaller computers.

Wireless communications demos will take many forms. NCR Corp., Toshiba America Information Systems, Inc. and Zenith Data will be among the vendors showcasing portables working in a wireless environment.

Motorola, Inc.'s Robert Grawley, executive vice president and general manager of the paging and wireless data group, cautioned that while plenty of products will be released during 1993, standards are two to three years away.

"Wireless is off the paper napkins and onto bond paper, with some hard products out there, but it takes some time to acquire substance," he said.

Thirty-two bit applications are vaporware no more. Look for more third-party demonstrations of real applications running on the 32-bit platforms, including mainstream

# Sybase unveils System 10

By Jean S. Bozman  
SAN FRANCISCO

As expected, Sybase, Inc. last week laid out Sybase System 10, its sweeping vision of client/server computing, but stopped short of giving shipment dates for specific components such as its enhanced relational SQL Server 10 database server and new distributed-processing options.

System 10 is a series of new products designed to attack many problems associated with real-time distributed database computing.

The products include the SQL Server 10, Replication Server software for distributing updates to multiple sites, Navigation Server software for parallel data query and massively parallel systems, the OmniSQL Gateway for reaching relational databases made by other vendors and Control Server software for better performance monitoring, backup and recovery of on-line database systems. Prices were not disclosed.

Sybase marketing Vice President Stewart Schuster said all System 10 products would be beta-tested in the first half of 1993 and shipped sometime during the year. That coincides with the first volume shipments of rival Oracle Corp.'s Oracle 7 relational database system, which has many distributed database features.

Industry analysts said Sybase's vision

suppliers such as Lotus and Computer Associates International, Inc. Lotus is also revamping the OS/2 version of its CC:Mail electronic-mail software (see story page 14).

The multimedia pavilion will feature big splashes, with Microsoft's recently announced Video for Windows and Apple Computer, Inc.'s new Windows version of Quicktime likely proving a big draw.

IBM will display motion video software support for OS/2 called Ultimotion and a beta-test version of Multimedia Presentation Manager/2.

Intel Corp. will showcase Indeo, a video compression algorithm that offers scalable software motion video performance. Indeo is already lining up industry support.

Number crunching applications might not be there yet, but hardware makers plan to serve up a buffet of conventional and multiprocessing servers this week. Intel's next-generation Pentium chip will be shown running inside boxes positioned as next year's high-end servers from a number of suppliers, including NCR Corp., Dell Computer Corp. and AST Research, Inc. Others demonstrating Pentium-based systems look to include IBM and Digital Equipment Corp.

Citrix Systems, Inc. in Coral Springs, Fla., will demonstrate its new Windows-based dial-in remote access product.

Computerworld staff members contributed to this report.

was sweeping but may have missed a few spots, including computer-aided software engineering and migration tools. "They've provided a road map, all right, but there are many places where the bridges are out and the road doesn't exist," asserted Brian Boyle, director of research at Novon Research Group.

"I think what they missed is providing

power tools to help people get from central mainframe operations to decentralized servers," he added.

However, many Sybase sites are eager to get the Replication Server because distributing updates has been a problem for sites with multiple Sybase servers. The OmniSQL Gateway, built on top of older Sybase gateway technology, will address operational concerns in multivendor database sites.

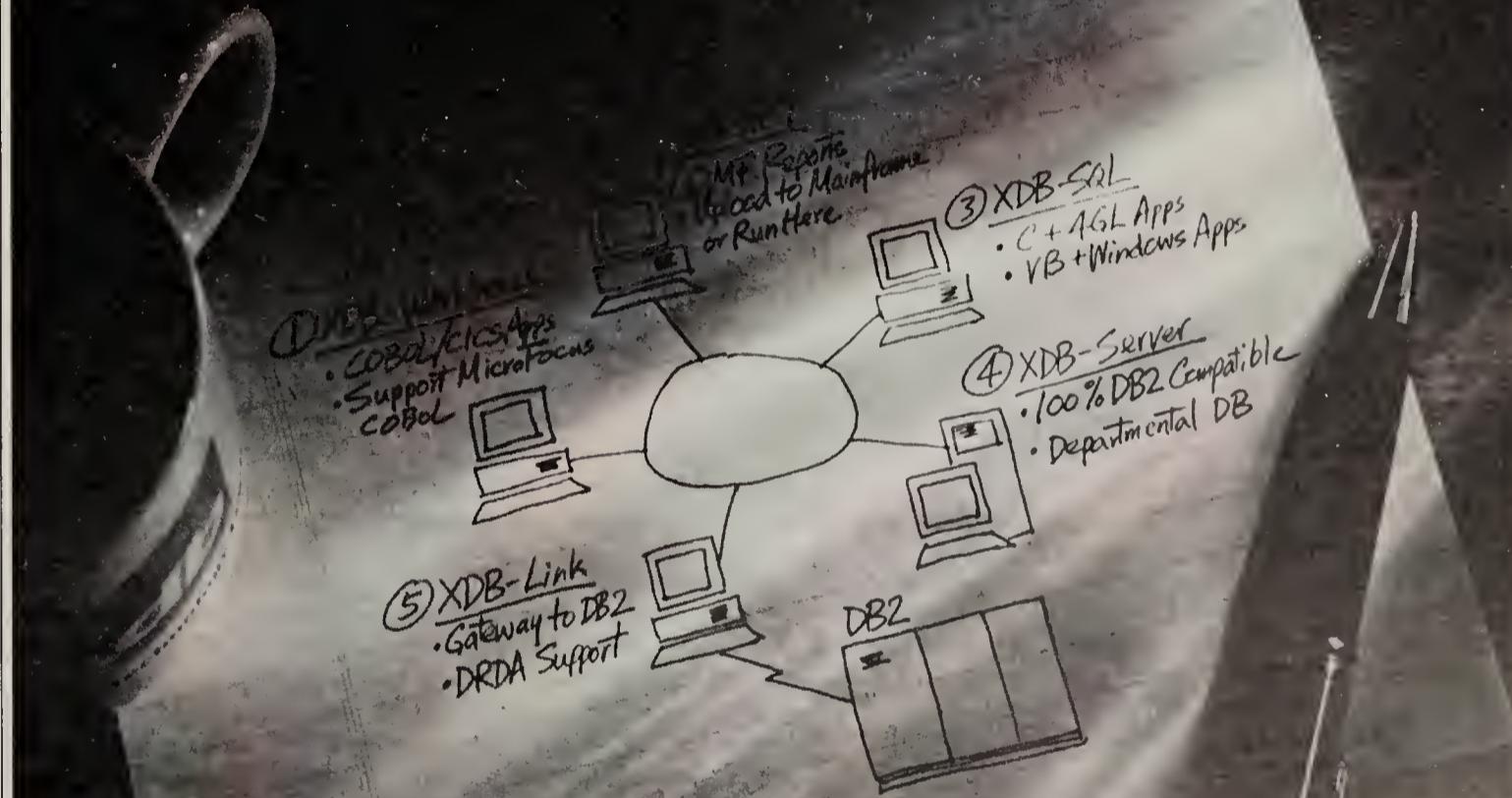
One early OmniSQL user, the United

Leeds Teaching Hospital in Leeds, England, tried OmniSQL with both Sybase and Oracle servers in September.

"We've been able to build, within the Gateway, views of both the Oracle and Sybase tables, and we're now beginning to see the OmniSQL Gateway as being the database," Ian Frost, assistant director of information services, told a London Sybase briefing recently.

*IDG News Service correspondent Ron Condon contributed to this report.*

# 5 ways to put DB2 power on your desktop.



Only XDB products make your PC work like a mainframe by giving you 5 ways to put DB2 power on your desktop. And when we say power — we mean it. All XDB products have one thing in common...100% DB2 compatibility.

XDB lets you develop COBOL programs with XDB-Workbench and QMF reports with XDB-QMT on the PC, and run them on the mainframe. XDB also gives you XDB-SQL to build SQL-based Windows or 4GL applications.

Your XDB applications can run stand-alone or against an XDB-Server. They can even reach

out and talk to DB2 on the mainframe through XDB-Link. With DRDA and RPC support.

Most importantly, as you add desktop tools and client-server technology, you don't end up with incompatible systems. Everything follows the DB2 standard.

This means XDB provides powerful features like full SQL syntax and system catalog, referential integrity, transaction processing, concurrency control, and security — just as DB2 does.

Only XDB provides this power across DOS, OS/2, Windows and UNIX platforms. XDB also lets

you choose from over 50 front-end tools — provided by industry leaders like Intersolv, KnowledgeWare, Lotus and Powersoft.

So call 1-800-488-4948 ext.520 to find out why over 25,000 corporate users have chosen XDB to satisfy their hunger for DB2 power. Tell us which way you want to put DB2 power on your desktop.



**XDB**

**XDB Systems, Inc.**

301-317-6800 301-317-7701 (FAX)

## News Shorts

## DEC software exec resigns

David Stone, vice president of Digital Equipment Corp.'s Software Group, is starting a new job today as president of the operations systems business unit within AT&T's network systems, partly in response to restructuring at DEC, internal DEC sources said. Dennis Roberson, vice president of corporate software, will take over some of Stone's duties. What the consequences will be on DEC's software strategy are unclear.

## Parallel RS/6000 expected

IBM is slated to unveil its first parallel processing RISC System/6000 this week at the Supercomputing '92 Conference in Minneapolis, sources close to the company said last week. The four-processor Shared Memory Powerparallel System is intended for scientific and technical markets only. The new system is not part of IBM's work with Bull HN Information Systems, Inc., however. IBM and Bull are developing multiprocessor RS/6000s for commercial transaction processing.

## College exec nabs Cause, AMS awards

Boston College's executive director of information technology, Bernard Gleason, last week became a two-time winner. He won both the 1992 Cause Elite award for exemplary information systems leadership — given by the higher education IS community's professional association — and one of the annual awards for achievement in IS given jointly by American Management Systems and Carnegie-Mellon Graduate School of Industrial Administration. The other 1992 winners were Salomon Brothers, Inc.'s Peter Bloom, The Chase Manhattan Bank NA's Craig Goldman, McGraw-Hill, Inc.'s Robert Lynch and Wal-Mart Stores, Inc.'s Bobby L. Martin.

## That's Dr. Robot to you

A 64-year-old man received a new hip last week with the help of a robot, which was used for the first time to prepare a hip socket for a prosthetic implant more precisely than traditional surgery could, according to doctors at Sutter General Hospital in Sacramento, Calif. The robot and preoperative planning software were provided by Integrated Surgical Systems, Inc. in Sacramento.

## Surprises from Wang

Wang Laboratories, Inc. previewed several products last week — some expected, others not. Unanticipated products included three new minicomputers, due to be formally announced early next year, to expand the middle and high end of the VS line. Wang also demonstrated Open/Office 3.0, a Unix version of its office automation and electronic-mail system to run on IBM's RISC System/6000. The Chapter 11-protected company finally rolled out Open/Pace, an RS/6000 edition of its database/application development environment. Wang originally showed the product a year ago running on SCO Unix but shelved that version after signing a contract to support IBM's Unix line.

**SHORT TAKES** Mainframes at Comdex/Fall '92? Yes, IBM will make the PC-oriented show with its big iron running multimedia software for the first time.... IBM also introduced a new version of its Workstation LAN File Services software, which runs under VM and turns the mainframe into a superserver for PCs connected to local-area networks. It also announced shipment of its 9337 storage subsystem, based on redundant arrays of inexpensive disks (RAID), making it the first vendor to deliver RAID for the IBM Application System/400.... Comshare, Inc. in Ann Arbor, Mich., announced a Microsoft Corp. Windows version of its Commander decision-support software.... BMC Software, Inc. this month will unveil a network-tuning package that runs on IBM's 37XX family of front-end processors.

# HUD, Martin Marietta celebrate outsourcing contract success

Pact is expected to save taxpayers roughly \$100 million over 10 years

By Gary H. Anthes

WASHINGTON, D.C.

Two years after signing one of the largest outsourcing contracts ever, the U.S. Department of Housing and Urban Development (HUD) and Martin Marietta Corp. contend they are months ahead of schedule and millions of dollars below budget — characteristics not seen in many government systems projects.

But inside HUD, applications development and maintenance — the only data processing functions not outsourced — are not faring so well, charged critics, who pointed to a choppy sea of poorly integrated, conflicting and unreliable financial management systems.

The outsourcing project, called HUD Integrated Information Processing Service (HIIPS), consists of a 30-month effort to transfer all computer processing and data communications to Martin Marietta, followed by 10 years of running the new data center and network.

## Below budget

The project is now 20%, or \$18 million, below budgeted cost. Transition to a new data center was accomplished eight months early, and the nationwide data network went up three months early, according to Donald C. Demitros, director of HUD's Office of Information Policies and Systems. He said HUD expects the outsourcing deal to save taxpayers \$100 million over 10 years.

And that is not all.

"It's one of the largest IS contracts in years, and it's had no negative press, no congressional investigations — and there have been no protests," said Ned Cooper, vice president and head of the \$526 million project at the Martin Marietta

Information Systems Group.

There is no magic or silver bullet at work here, according to the agency and its contractor. The project's success hinges on a harmonious relationship between the parties, which stems from extraordinarily careful preparation and execution of the bid solicitation, Demitros said.

HUD began planning for the outsourcing in 1983 and made an award in 1990, after making more than 100 revisions to the solicitation based on industry feedback. Martin Marietta, which battled Boeing Computer Services Co. and Electronic Data Systems Corp. for the job, had as many as 50 people working on the bid at one time. The companies may have spent as much as \$10 million each on their proposals, observers said.

Demitros said another reason for success is that HUD did not follow the more common government practice of sitting on its hands while waiting for a systems integrator to deliver the goods. On any one day, HUD has 25 to 75 people supervising project activities.

Organization is key, Demitros added. "Martin Marietta set up a team, and we established a mirror image. We have peer-to-peer talking. I can always find two people — a government person and a vendor

person — to hold accountable."

Other innovations have been more technology-driven. HUD's plan had been to set up a new data center and replace two aging networks with a new network, then bring up the whole thing all at once in one "big-bang" finale. But Martin Marietta found a way to make the transition faster and more gracefully.

"We were able to do more any-to-any connectivity so we could connect new terminals to old mainframes and new mainframes to old terminals and have all three networks interoperate," Cooper said.

That allowed HUD to move applications to the new data center early and realize cost savings by terminating a time-sharing agreement and closing a data center early.

Although they are not part of the outsourcing project, HUD has worked hard to put together applications with two objectives: to give employees a common set of tools agencywide and to give them access to all computer environments.

"We have one E-mail package, one word processing package, everyone uses the same menus, the same log-ons and so forth," Demitros said. "No other cabinet-level agency and very few large commercial enterprises can say that every employee uses the same things."

## Closing the gate after "Robin HUD"

In 1989 a HUD employee, known later as "Robin HUD," exploited flaws in the agency's financial systems in order to make off with \$6 million. A subsequent report by HUD's inspector general revealed that HUD had more than 70 poorly integrated, sometimes conflicting and often unreliable financial management systems.

In January, the U.S. General Accounting Office (GAO) announced that HUD's problems remain largely unresolved. Poor systems "leave the department open to fraud, waste, abuse and mismanagement," the GAO charged.

HUD IS chief Donald C. Demitros did not dispute that bleak assessment: "HUD has been criticized, [and] rightly so, for having poor financial systems."

Demitros said HUD is spending \$40 million annually on application development — much of that for seven new financial systems to replace the 70-odd existing systems. He said HUD is 18 months into a five- to seven-year financial systems reform project.

The system exploited by Robin HUD, which failed to properly match the sale of houses with cash received for them, has been rewritten, Demitros said, adding that "we have a long way to go. There are still a lot of fixes to be made to systems."

His efforts may be slowed by budget cuts that hit HUD hard this year; Demitros said he got 20% less than he had requested for the financial systems reform effort.

— Gary H. Anthes

New!

# 2 out of 3 users prefer Quattro Pro for Windows

## An independent study proves it

It's a fact: Two out of three Windows spreadsheet users tested prefer Quattro® Pro for Windows. That's the result of a study conducted by Usability Sciences Corporation, a highly regarded, independent testing lab used by major software publishers, including Lotus.

Built with Borland's renowned object-oriented technology, Quattro Pro for Windows is packed with hot new features that make it more powerful, yet easier to use, than any other spreadsheet.

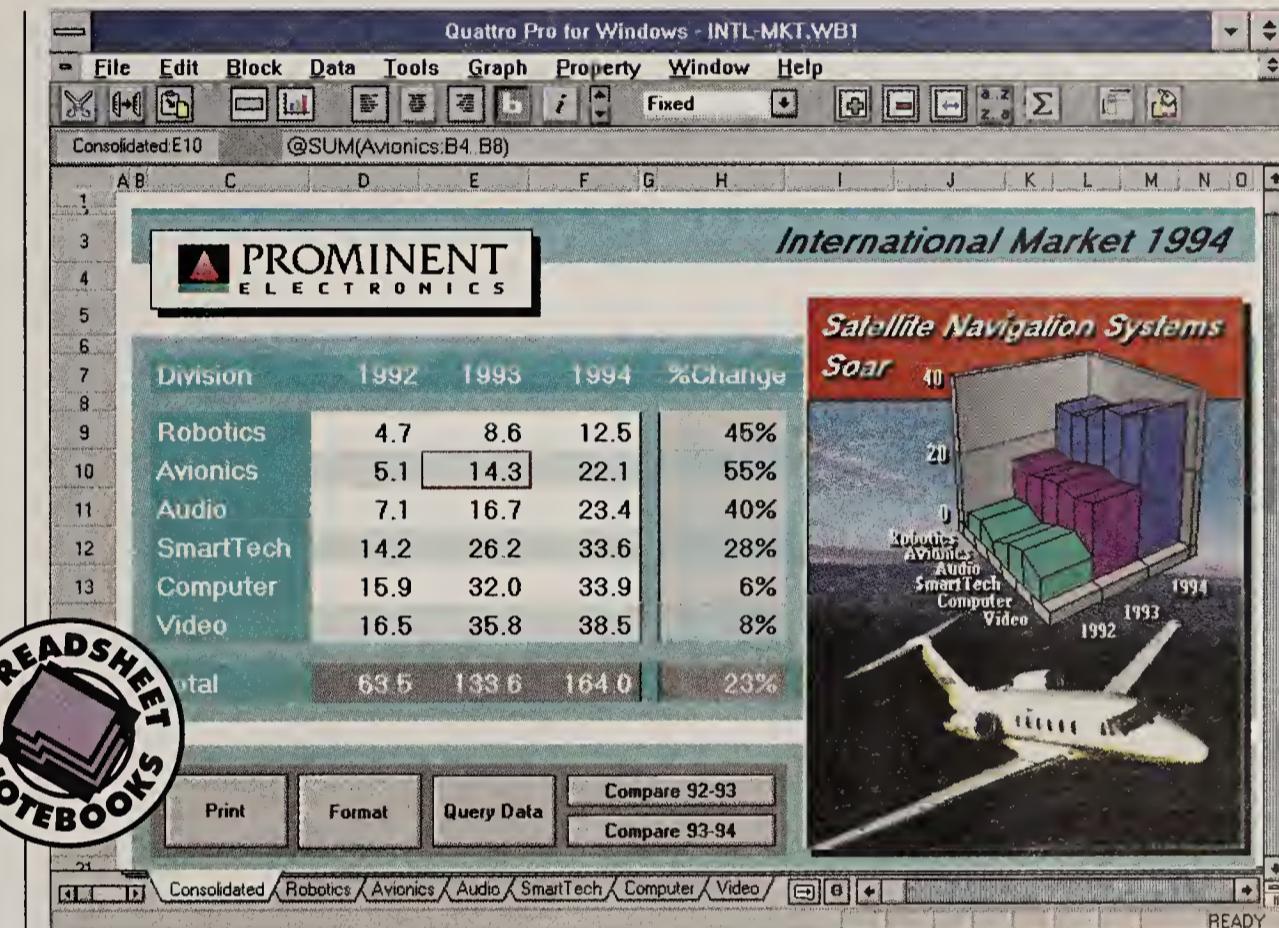
**NEW! Spreadsheet Notebooks** with customizable tabs are nothing less than a revolution in spreadsheet ease (*and speed*) of use. Now you can intuitively organize and manage your spreadsheet data as easily as flipping through a notebook.

**NEW! Object Inspector™ menus** end the hassle of searching through menus. Just click the *right* mouse button anywhere on the screen to get a list of what you can change and change it right there.

**NEW! Database Desktop™** gives you the easiest way yet to get Paradox® and dBASE® data into your spreadsheet.

**NEW! SpeedBars™** are context-sensitive and customizable. SpeedBar icons give you pushbutton access to your most frequently used commands.

**NEW! SpeedFill™ and SpeedFormat™** slash spreadsheet setup time by automatically filling in worksheet headings and formats.



**NEW! Presentation Graphics** and drawing tools that rival those of Freelance and Harvard Graphics are built-in. You don't need to buy a separate graphics package.

**YES! Compatible** with Lotus 1-2-3 files, macros, and publishing styles (including Allways, Impress, and WYSIWYG). It also supports Excel .XLS files.

**Don't settle for second best**  
Borland has radically simplified the use of the world's most feature-rich spreadsheet. Get Quattro Pro for Windows today. It's the most advanced, yet easiest-to-use spreadsheet ever.

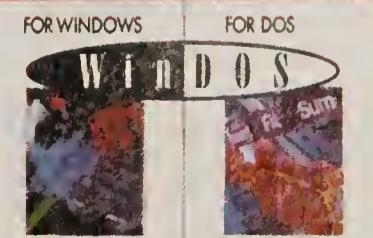


Special limited-time offer!  
**Quattro Pro for  
Windows and for DOS**

**Now together for  
the price of one!**

See your dealer today or call  
**1-800-331-0877, ext. 6491**

In Canada, call 1-800-461-3327

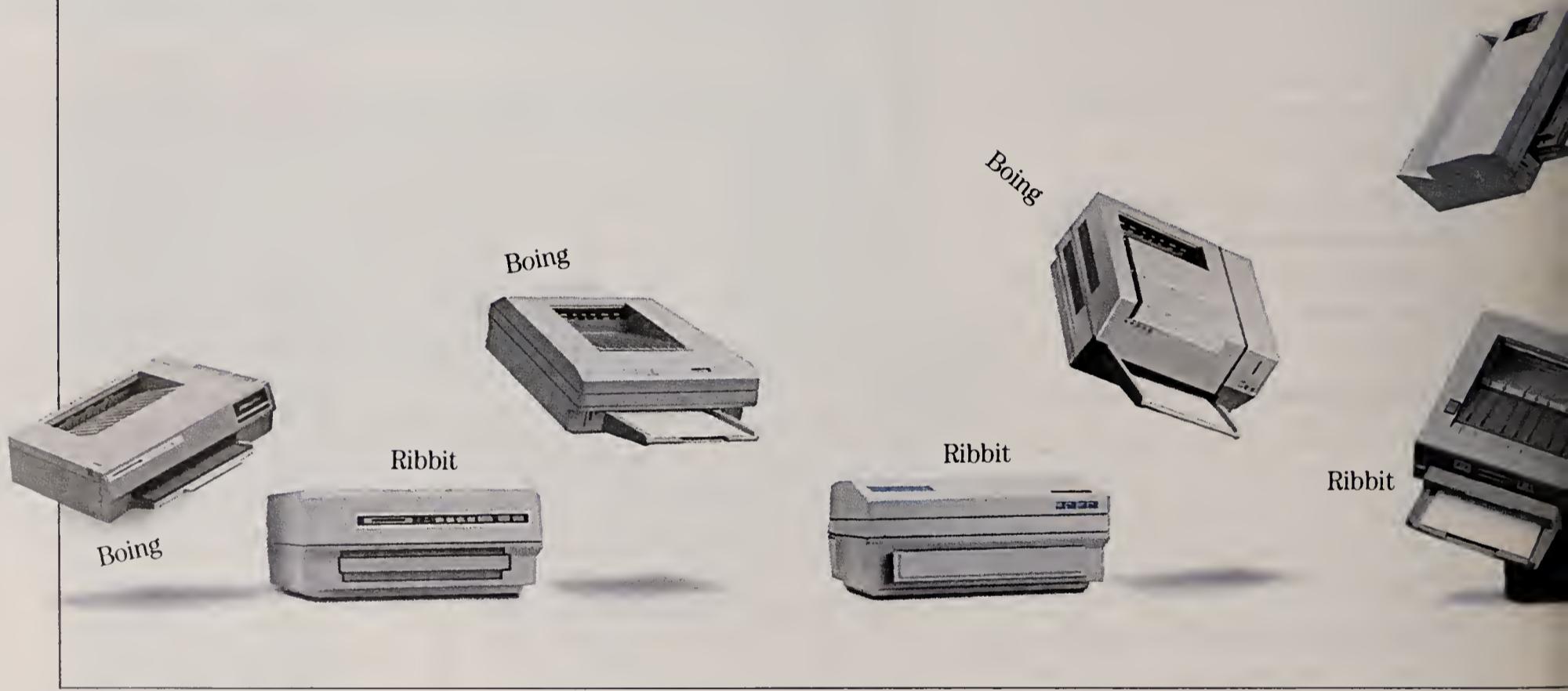


**BORLAND**

*Software Craftsmanship*

Copyright © 1992 Borland International, Inc. All rights reserved. All Borland product names are trademarks of Borland International, Inc. Quattro Pro for Windows and Spreadsheet Notebooks have patents pending. Photo furnished by Cessna Aircraft Company. BI 4605

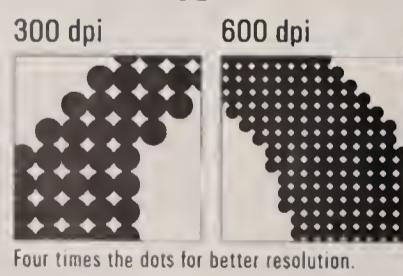
# Other laser printers play leapfrog trying to catch up with the HP LaserJet.



The new HP LaserJet 4 printer isn't a hopped-up version of the past generation. Its new, advanced design sets much higher standards for print quality, speed, built-in features and value than ever before.

#### Higher resolution. More typefaces.

Unlike other 600 dpi laser printers, the HP LaserJet 4 was designed for 600 dpi printing from the ground up.



As a result, it produces the best 600 x 600 dpi resolution ever for noticeably crisper, clearer text and graphics. At less than a 300 dpi price.

Microfine toner and HP's exclusive Resolution Enhancement technology give you razor-sharp edges and much smoother curves.

With 45 scalable typefaces built into the printer, users can produce a wide variety of documents. Without hassling with downloading or accessory cartridges. Or buying additional typefaces.

#### More speed, more trays, more flexibility.

Thanks to a new RISC processor, tuned vector graphics and faster I/Os, the HP LaserJet 4 also sets new standards for speed. It even prints many 600 dpi graphics at a true 8 pages per minute. It's faster on networks, too.

With 2 MB of memory built in and new internal memory compression algorithms, virtually all 300 dpi and many 600 dpi documents print from standard

memory. Two standard paper trays, with a total capacity of 350 sheets, and an optional 500-sheet tray let users keep printing without constantly reloading different sizes and types of paper. And the optional 75-capacity power envelope feeder saves them from manual feeding. Or dealing with jams.

True 600 dpi creates rich, full-dimensional text and graphics

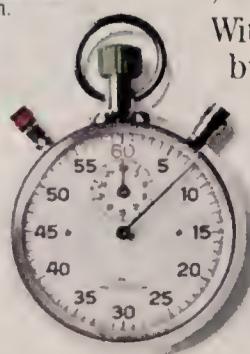
Smoother curves, no jagged edges, thanks to Resolution Enhancement.

HP's microfine toner makes 600 dpi output look even sharper and clearer.

45 built-in scalable typefaces let users produce a wide variety of documents.



The HP LaserJet 4 is leaps and bounds ahead of the other laser printers. Our new generation provides superior output with 600 dpi, Resolution Enhancement technology and microfine toner. It also comes standard with 2MB memory and new memory management.



# Introducing the new HP LaserJet 4 printer. So advanced, there's no catching it.



## Mixed environment compatibility. Faster Windows.

The LaserJet 4 is very much at ease with most languages and personal computing platforms. Automatic switching lets it switch between HP's PCL 5 printer language and optional PostScript Level 2 software from Adobe. Hot I/Os allow different hosts to be connected simultaneously.

Optional JetDirect cards provide LAN connections to Ethernet, TokenRing, TCP/IP and LocalTalk/EtherTalk. This makes it easy to plug into just about any network, including PC and Mac LANs. And to get really fast network performance.

To optimize the LaserJet 4 for Windows printing, we codeveloped some breakthroughs with Microsoft. Including Windows 3.1 TrueType fonts and rasterizer built in to make sure your users get fast, WYSIWYG printing. The fast

Windows driver with HP-GL/2 vector graphics also enhances printing speed.



Several popular software drivers are included: Windows, WordPerfect and Lotus. As well as the new HP Explorer PC utility software,

which provides a printing tutorial to guide your users through set-up and operation of the printer's new features. All this makes the HP LaserJet 4 printer supremely simple to plug-and-play. As you'd expect, it also offers complete document and software compatibility with the HP LaserJet III printer.

**Setting the standard in price, too.**  
With all these advances and more, you'd expect a big jump in price.

Quite the opposite. At just \$2,199\*, the HP LaserJet 4 printer lists for less than

the printer it replaces. And, of course, it comes with pace-setting HP quality and reliability.

Call 1-800-LASERJET (1-800-527-3753), Ext. 7133 for the name of your nearest authorized HP LaserJet dealer.† And ask for a print sample to see just how great the output looks.\*\*

**If it isn't a LaserJet,  
it's only a laser printer.**



**HEWLETT  
PACKARD**

# Aiming high: Microsoft woos IS

CONTINUED FROM PAGE 1

"You just can't have faith in Microsoft that they know where they're going, they're going to support you, and they're going to be there," said a director at a California firm who wished to remain anonymous. He said he has worked unsuccessfully with Microsoft.

Microsoft's general manager of business strategy, John Neilson, conceded that Microsoft must address that lack of trust if it is to succeed in working with large corporations.

"If we start making recommendations that put IS jobs at risk, they won't trust us," Neilson said. He indicated that Microsoft has several plans in the works that the company hopes will address the trust issue.

Those plans are aimed at addressing the needs of today's environment, where IS personnel must not only be technically fluent but must understand the business as well.

To that end, most IS managers said what they are looking for from Microsoft is "everything and more." Specifically, the company needs to move beyond marketing and support changes to gain a real understanding of what is involved in managing thousands of pieces of software that are vital to keeping customers' companies running. So far, that understanding seems superficial at best, users complained.

## All the big firms do it

Microsoft "is probably going to have to do what IBM does, which is overkill," said Roger Jamboor, vice president at Dun & Bradstreet Corp. IBM representatives on site "basically live here" supporting policies that cover all the bases from debugging to upgrading to locating consulting services. "All the [big system] software companies do it," he said.

Jamboor's point is key. If Microsoft wants to be considered a strategic partner on a par with traditional IS partners — IBM, Digital Equipment Corp. and Hewlett-Packard Co. — it will have to play by the same rules.

"They're going to have to concentrate on business needs," said a director at a large California firm who wished to remain anonymous. Microsoft does not "have the business processes [in place] to support the customer yet."

He went on to say that Microsoft needs to understand that support for a large business encompasses far more than what a single PC user needs.

It has to include not just the software, but the business that runs on that software. Microsoft has "bright technical folks but not good busi-

ness folks," he concluded.

Microsoft is responding to that criticism. The company is reported to be actively recruiting experts in fields in which it has little experience, particularly in dealing with systems outside the PC realm, such as DEC, HP and IBM machines. "It's been an incredibly concerted effort," said Krystyna Filistowicz, an analyst at Dataquest, Inc. in San Jose, Calif.

Neilson did not confirm the recruitment effort but said Microsoft needs to do a better job addressing customers' multiplying multivendor computing needs. Customers "want us to develop a lot of skills" to help

What's the beef?	
93 mid- to top-level IS professionals with 50 or more PCs installed relate what Microsoft needs to do to become their strategic partner	
Number of responses (multiple allowed)	
Bolster customer support	6
Pay more attention to integrating with high-end systems	8
Improve customization services	5
Offer better solutions to enterprise computing	4
Provide better coordination between direct sales and resellers	4
We are not interested in Microsoft's becoming our strategic business partner	14
Other	54
Other suggestions include: ←	
<ul style="list-style-type: none"> <li>• Address business needs better</li> <li>• Drop concern with being No. 1</li> <li>• Better open network standards</li> <li>• Offer better site licensing</li> <li>• Offer discounts to developers</li> </ul>	

Source: CW Database Division

provide mission-critical applications and access heterogeneous data, he said. "Customers don't want us to say, 'We'll do a great job on the desktop, but sorry, you've got to get DEC for networking.'

Giving the customer a voice in product direction is also key, said a technology director at a large New York bank. "In the past, it was 'send me your order and I'll send you an invoice.'" These days, he said he sends a team to Redmond, Wash., to discuss products and directions.

In addition, Microsoft is making allowances for multinational companies and the difficulties of supporting licensing agreements over-

seas and multiple-language copies of products. By streamlining licensing programs, Microsoft has reduced large customers' legal concerns.

Customers also expect help with internal distribution issues. "It's one thing to give a customer a master disk and manual and say 'have a good time,'" said Jo M. Haraf, director of office technology at Booz, Allen & Hamilton, Inc. "It's another thing to have a distribution plan."

## Changes in the works

Seismic activity surrounding the required changes is there:

- Microsoft has begun implementing its Channel Partners programs to provide extra support for integrators and value-added resellers in vertical markets.
- The role and size of Microsoft Consulting Services is being expanded.
- Support services now include seven-day, 24-hour technical support as well as "hot site" on-site service.

Microsoft also recently had a meeting with several Microcomputer Managers Association members to discuss the vendor's plans for working with large customers and to solicit advice on what kinds of programs need to be implemented if Microsoft is to be taken seriously.

Another issue being addressed is the need to put a more consistent "user interface" on the company so customers will no longer find themselves dealing with several autonomous regions when trying to work with the company. Microsoft is said to be implementing changes in that area.

All of these measures are oriented at satisfying large customers who demand that their vendors understand the overall computing realm and not just the box their software runs on.

"Microsoft needs to make inroads into MIS, where they speak a number of different languages," said John Dunkle, president of WorkGroup Technologies, Inc. in Hampton, N.H. "What Microsoft can offer is integrating the desktop to those upper end systems."

However, despite all this talk — and indeed, some concrete evidence of change — it may still be several months before the real impact of all these changes is felt by any but a few customers.

Microsoft has "assigned people to our company, and they relate to us from a technology standpoint, but that's about all I see," said Joe Hunter, MIS manager at Baltimore Gas and Electric Co. "Maybe it's out there, but they haven't gotten the message through to me that there's a significant change in how they do

business."

Still, other IS directors are hopeful that the improvements they are hearing about will translate into tangible offerings soon.

"We're building stronger relationships with [Microsoft]," said a technical director at a large bank in New York. "Is it going as fast as we want? Of course not; it never does."

But users seemed confident that Microsoft can, and will, take firm steps to meet their needs, even though patience may be required. "Microsoft is definitely listening," Haraf said. "I've got great hopes for them."

Microsoft's track record of making things work, even if it takes more than one try, is impressive, some observers said.

"There are very few areas where Microsoft has articulated a strategy where they are not successful," Filistowicz said. "And make no mistake, they want to own it all. They just don't have all the pieces yet."

## At a glance

**Microsoft claims** to receive more than 19,000 support calls per day, with more than 80% of them being responded to within 60 seconds.

**One in five** Microsoft employees is in product support services, according to the firm.

**Microsoft's conversations** with IS have turned up four key requests: more line of business applications, rapid development and deployment of applications, design review services for downsizing and the ability to customize.

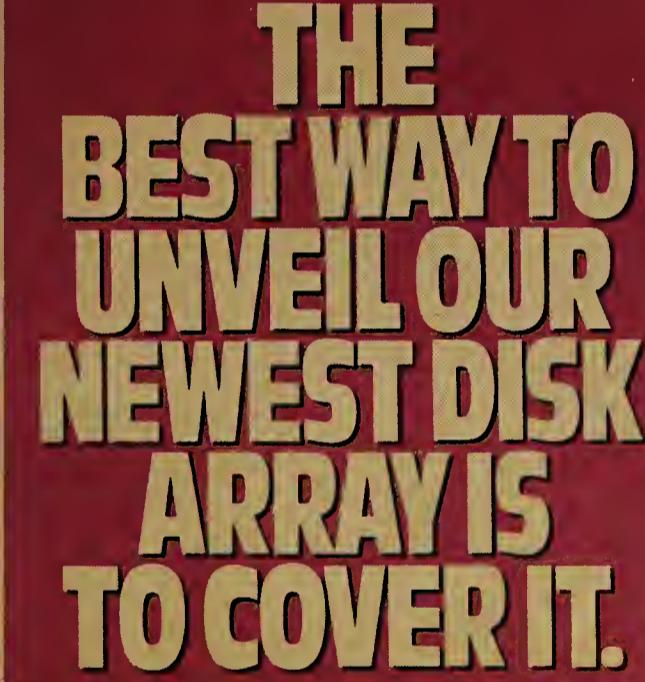
## Coming soon

Although he could not yet provide full details, John Neilson, Microsoft's general manager of business strategy, last week ticked off the following indications of what policy changes large customers can expect to see as early as January:

- A much-simplified licensing program that takes into account the needs of multinationals that want multiple language versions of software on several platforms in many countries and still want to write one check for everything. The company also said it will implement ways to dramatically decrease turnaround time on purchases.
- A "menu" of support options for users, including the ability to bring "on-demand" Microsoft experts on site to assist with specific projects.
- An increase in Microsoft expertise in areas besides PCs, including mainframes and networking, through closer relationships with vertical market suppliers and hardware vendors and by bringing outside experts into Microsoft.
- The ability to provide consistent support policies throughout the world, including support for software asset management and upgrading through service providers.
- Improved dissemination of technical and strategic information to customers through programs such as executive symposia for chief information officers. The company has even offered to keep an account on corporate electronic-mail systems through which it could distribute information directly to interested parties. Formalized means of collecting information from customers will also replace the current "ad hoc" system.



John Neilson:  
changes are en route



**THE  
BEST WAY TO  
UNVEIL OUR  
NEWEST DISK  
ARRAY IS  
TO COVER IT.**

As far as performance is concerned, our new 7637 Model 20 DASD has you covered—with the latest 3.5" disk technology supported by the very first 3-year warranty in the industry. Combine that with our superior engineering and architecture, and you have the best 9336-compatible DASD on the market today.

We begin with the most advanced 3.5" 1 GB disk drives ever made. With features that include a super-fast 9.8 ms seek time, read-ahead cache,

magnetoresistive head Nanoslider and 256KB segmented data buffer. Add to that, options like controller cache memory for faster throughput and dynamic sparing for maximum system uptime—both market firsts from IPL. All at a lower cost per MB than IBM's 9336 Model 20. And all fully compatible with IBM architecture and diagnostics.

It all adds up to unmatched reliability and the best buy you can make in AS/400 DASD storage. Guaranteed. To learn more, call IPL at 1-800-338-8475, 617-890-6620 in MA. In Canada call 800-565-5606. In Europe call 011-32-2725.4158.

#### **IPL 7637 Model 20**

- **3-year warranty**
- **Advanced 3.5" HDA technology**
- **40% less rack space**
- **Dynamic sparing**
- **128 MB cache memory**
- **No maintenance costs for 3 years**

**ipl**  
SYSTEMS

**The Smart Choice  
for AS/400 Storage.**

**B**uilding inexpensive computers isn't exactly earth-shattering news.

Building inexpensive computers that still deliver IBM quality is.

Yet, that's precisely what PS/ValuePoint™ does.

## Introducing

# PS/ValuePoint



### Model 325T

386 SLC™ 25 MHz System  
2MB RAM, 80MB HD  
5 AT Slots/5 Bays  
IBM Enhanced Keyboard/  
Mouse/SVGA  
DOS 5.0 Pre-installed  
PS/2® 8511  
Color Display-VGA  
**\$1,299\***

PS/ValuePoint is a whole family of computers that lets you spend less, without settling for less. Lets you economize, without compromise.

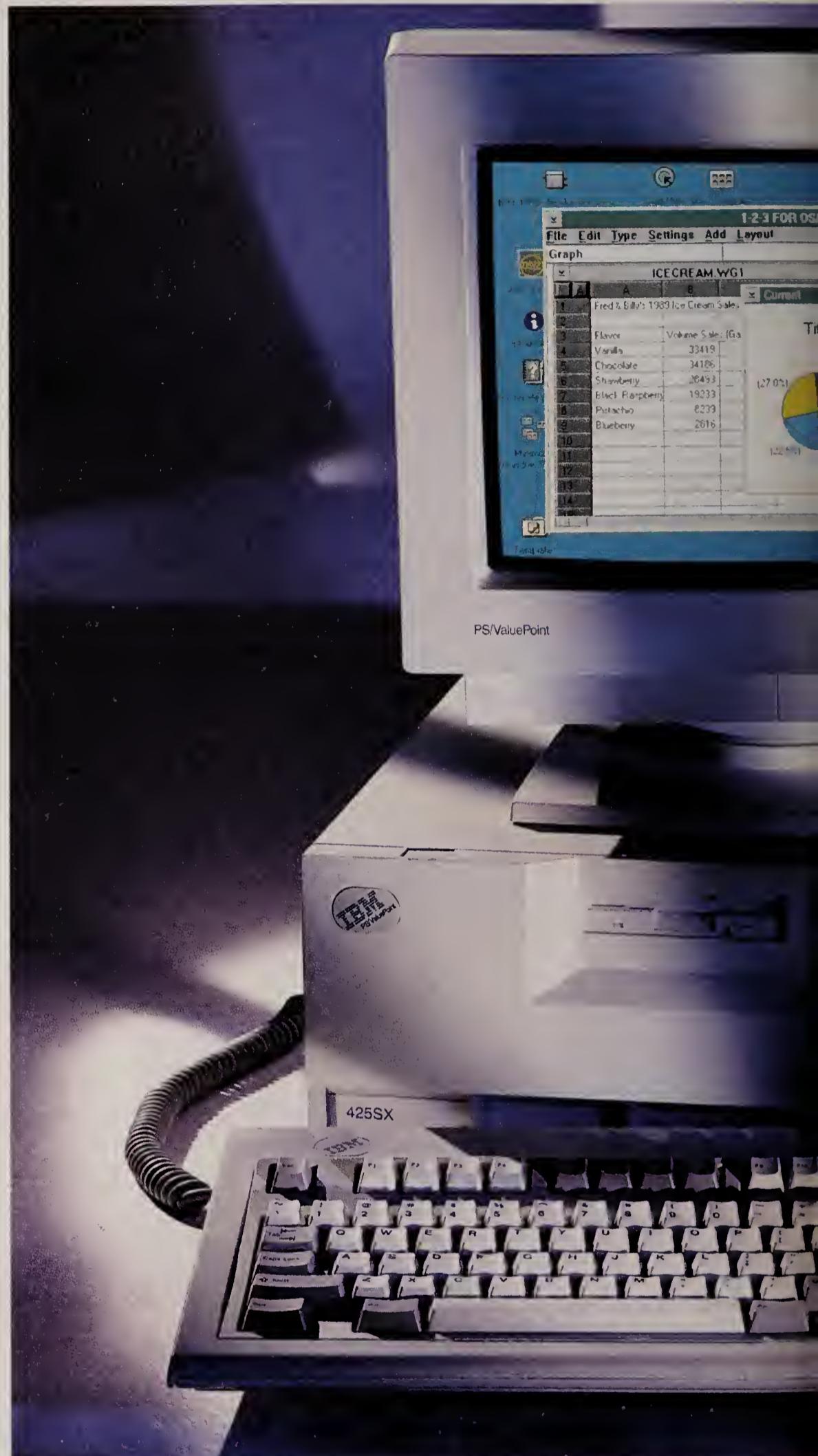
Each PS/ValuePoint is engineered to the IBM standards that have defined the personal computer industry. And rigorously tested to meet IBM's stringent demands for quality and reliability.

The PS/ValuePoint family is fully networkable, and Novell®-certified for use with Ethernet or Token-Ring LANs. So the PS/ValuePoint not only keeps your costs down, it protects the investments you've already made.

IBM also provides expandability for base products by offering new IBM hard drives, diskette drives and memory upgrades.

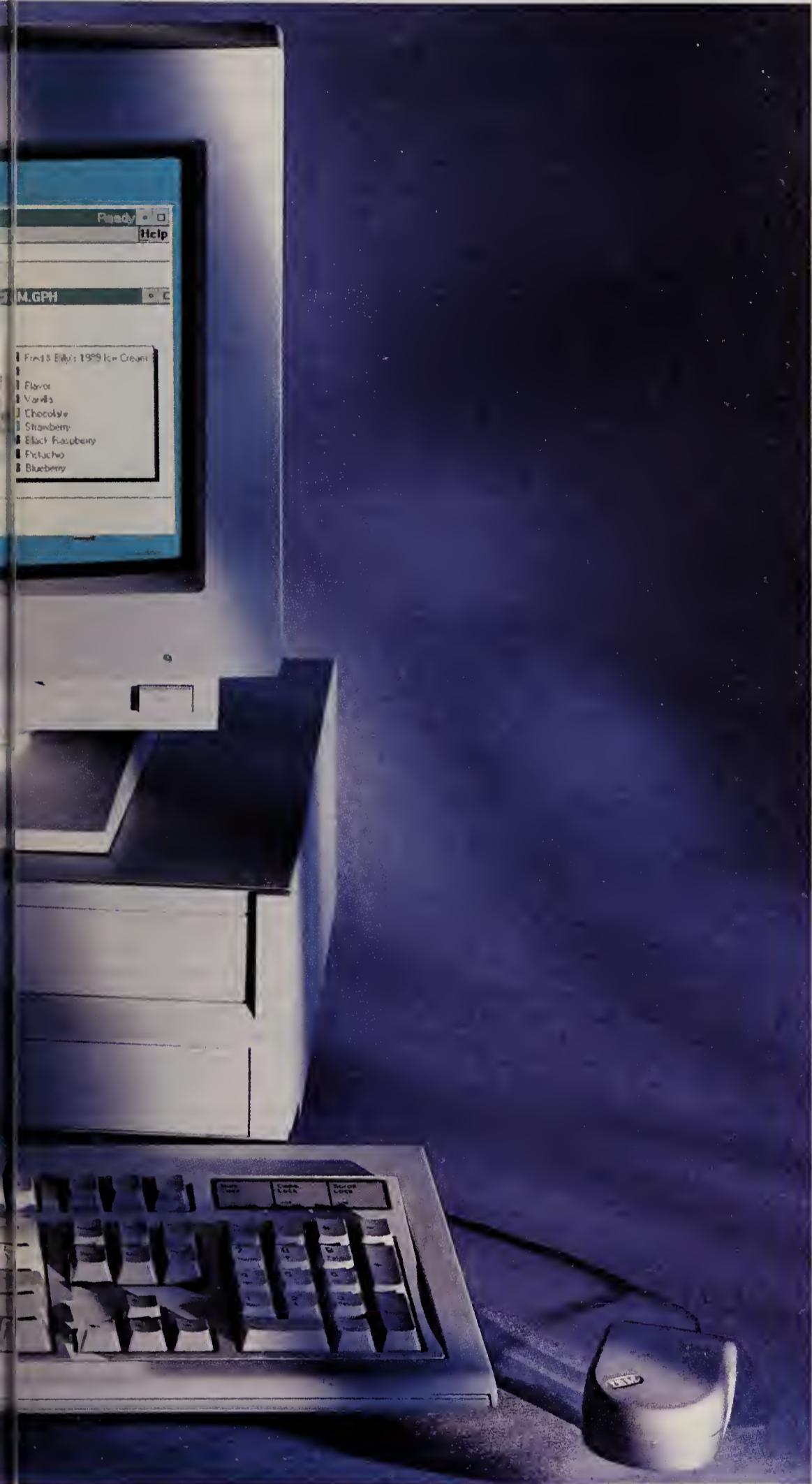


\*IBM prices, dealer prices may vary. \*\*Next business-day response when serviced by IBM or IBM Authorized Personal Systems Servicers. Available Monday-Friday, 8 a.m. to 5 p.m. in your time zone. Warranty and 30-day guarantee information available from IBM or IBM authorized dealers. <sup>†</sup>In Canada, call 1 800 465-7999. IBM, OS/2 and PS/2 are registered trademarks and PS/ValuePoint, SLC, HelpWare and HelpCenter are trademarks of International Business Machines Corporation. Novell is a registered trademark of the Novell Corporation. The Intel Inside logo is a trademark of Intel Corporation. © 1992 IBM Corp.



<sup>†</sup>Models 425 SX and 433 DX are shown with the PS/ValuePoint 6314 Color Monitor.

# Computers that do for practicality

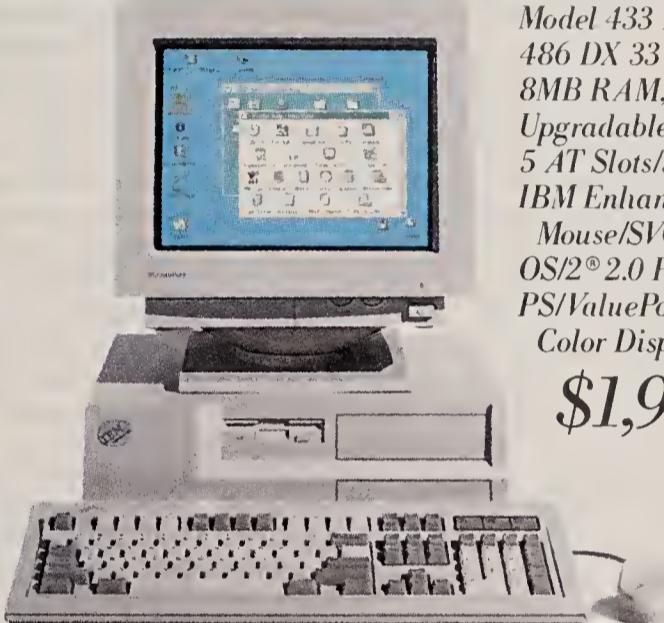


And every PS/ValuePoint includes one other very important point—HelpWare,<sup>™</sup> IBM's unparalleled service and support that offers one-year, on-site, next-business-day service.<sup>\*\*</sup> Around-the-clock assistance by telephone, bulletin board or automated fax. A 30-day money-back guarantee.<sup>\*\*</sup> Licensed Education Centers. And a generous trade-in program. Plus, IBM Credit Corporation has flexible leasing and financing packages to meet your needs.

That's a support package you might not expect even on the most expensive computers. On the PS/ValuePoint it's nothing short of phenomenal. As you can see, we've stripped down the price—but not the product.

**Model 433 DX<sup>†</sup>**  
486 DX 33 MHz System  
8MB RAM, 120MB HD  
Upgradable Processor  
5 AT Slots/5 Bays  
IBM Enhanced Keyboard/  
Mouse/SVGA  
OS/2<sup>®</sup> 2.0 Pre-installed  
PS/ValuePoint 6312  
Color Display

**\$1,999\***



Power. Quality. Service. Support. The PS/ValuePoint is everything you could ask for in a computer at much less than you'd expect us to ask.

For more information or an IBM authorized dealer near you, call our Personal Systems HelpCenter<sup>™</sup> at 1 800 772-2227<sup>††</sup>

**Model 425 SX**  
486 SX 25 MHz System  
8MB RAM, 80MB HD  
Upgradable Processor  
5 AT Slots/5 Bays  
IBM Enhanced Keyboard/  
Mouse/SVGA  
OS/2 2.0 Pre-installed  
PS/ValuePoint 6312  
Color Display

**\$1,629\***



Practically everything,  
nearly nothing.

## Commentary

Charles Babcock

## Peer support



I was working with a friend on a project for International Data Group recently with a full panoply of computing equipment: two VAXs and a dozen Macintoshes — including three Quadra 700s, QuarkX-Press and three laser printers — all of which were connected via Ethernet and AppleTalk. It was a good assortment for two people, but unfortunately, an envious IS group spotted our abundance and relieved us of two-thirds of it.

Neither one of us realized it, but a VAX — now removed — had been the server for our QuickMail E-mail system. We had been doing everything over QuickMail, moving stories over modem lines and exchanging edited versions. Some of these stories had suddenly disappeared with the VAX. Others were on my Macintosh and needed to be somewhere else. "David," I said to my acquaintance, now drafted as PC support technician, "let's move this file from here to there."

And he did. Many times. At a great expense of time.

When something goes wrong on your desktop, who you gonna call? Most likely it is not IS. More likely it is going to be David, under whatever name and title he happens to be disguised as he sits somewhere near you. It was not David's responsibility to support PC users. His job was managing copy flow, writing headlines and producing attractive pages. In the process of doing those things, he had learned more about our computing environment than anybody else except the IS director.

When the IS director left before the end of the project, David became the de facto technical support person, and it added hours to his job and hundreds of dollars of expenses that were hidden in his salary.

IS directors have long suspected that end-user technical support was costing more than their organizations realized. With their budgets constrained, IS has had little choice but to force end users to rely on the expertise in their own ranks rather than run to the professional staff with every glitch.

Just how much this entrenched, peer-to-peer technical support costs is the subject of a study by Nolan, Norton & Co. It concludes that it is much higher than imagined and much greater than the tangible expenses for hardware, software and IS technical support.

Nolan, Norton concluded that the known or budgeted spending per PC or workstation was \$2,000 to \$6,500. The unbudgeted or invisible PC/workstation spending came to another \$6,000 to \$15,000 per end user. The hidden costs are "peer support, people who are not counted in the IS head count but who provide peers with guidance and support in the use of end-user computing."

By closely accounting for this expense, companies are likely to find that it is equal to or several times greater than the accounted-for costs. In the end, this hidden expense will come back to haunt IS departments, with budget officers demanding to know why the company should pay for technical support in so many forms when it is funding a central department.

Because IS budgets are not keeping up with the pace of PC installations, technical support clearly must be selective. But the challenge is for IS to provide infrastructure and leadership in this evolving end-user picture.

IS must get the resources to provide a solid infrastructure and supply training and guidance. It then has little choice but to leave the rest to those talented end users co-workers rely on for help.

Babcock is *Computerworld*'s technology editor.

## Alpha hits the streets

DEC line gets good reviews despite a lack of available software

By Melinda-Carol Ballou  
BOSTON

The long-expected debut of Digital Equipment Corp.'s Alpha AXP systems last week was hailed by analysts and users despite the lack of a range of immediately available software.

DEC initially plans to ship around 10 applications, with between 50 and 100 additional third-party applications slated to ship by the end of December and at least 700 more to follow by summer 1993, said Steve Howard, marketing manager for Alpha applications at DEC.

"We're planning to provide a list of the ongoing status of application availability," Howard said. The company is also making a toll-free telephone number available for users seeking access to that information.

As expected, DEC also announced two low-end workstations with corresponding servers and three other servers for use with systems ranging from the desktop to the mainframe [CW, Nov. 9].

Company officials also demonstrated but did not officially release three products: an Alpha AXP PC running Microsoft Corp.'s Windows NT; a low-end version of the DEC 3000 Model 400 AXP desktop workstation, which is slated to be priced at less than \$10,000 when it ships in the spring; and a high-end workstation based on the design of the DEC 3000 Model 500 AXP desktop workstation, slated to run at 160 SPECmarks and ship in the spring.

Also announced were Advantage

Server turnkey systems that include CPU, memory, disk, tape, CD-ROM, services, choice of Open VMS or OSF/1 and Network Application Support (NAS) 300 applications at a discount. Pricing for the Advantage Server starts at \$20,720.

Users who had been waiting for Alpha details can now begin to make decisions. "The announcement makes it a lot more real and easier to plan things like getting the systems into our mix of hardware," said Joel Richon, a computer scientist at the Space Telescope Science Institute in Baltimore, which operates the Hubble telescope.

"The third-party software will be rolling out [over time], and the ultimate support for DEC software with clusters will be nice, but as long as we can get our data to Alpha and back, we can do our job," Richon said. His group has already ported some in-house applications to Open VMS on Alpha AXP.

DEC has been more forthcoming than in the past about its rollout plans for software and about the Alpha technology, according to Marge Knox, president of the U.S. chapter of the Digital Equipment Computer Users Society. In response to user input, for example, DEC moved up the timing for the release of VAX-cluster support, she said.

**A sample of DEC software products**  
Immediately available on Alpha AXP platforms:

**DEC FORTRAN AND DEC C COMPILERS:** ALLOW FOR MIGRATION OF C- AND FORTRAN-BASED APPLICATIONS TO ALPHA; \$650 EACH.

**DECNET FOR OPENVMS AXP VERSION 1.0:** OFFERS DECNET NETWORKING SUPPORT; \$1,200.

**DECSET:** PROVIDES CASE TOOLS FOR VMS; \$2,250.

**DEC MIGRATE:** A GROUP OF TRANSLATION TOOLS THAT TAKE EXECUTABLE VAX CODE AND GENERATE ALPHA CODE; \$589.

**NAS 250 AND 300 ADVANCED KIT:** SOFTWARE AND SERVICES TO MORE EASILY INTEGRATE ALPHA WORKSTATIONS INTO A CLIENT/SERVER ENVIRONMENT; SHIPS WITH WORKSTATIONS OR SERVERS.

"DEC took a drubbing in the press" for preannouncing Alpha, Knox said, "but the feeling that we were informed and able to help guide the process is important."

Analysts attempted to differentiate DEC's announcement from those of competing vendors Sun Microsystems, Inc. and Hewlett-Packard Co., which were made the same day (see stories page 4).

"It's like comparing apples and oranges," said Chuck Casale, an analyst at Aberdeen Group in Boston. "Sun is the undisputed leader of the low-cost, blue-collar workstation; HP is arriving at the high end."

DEC is not announcing one more in a series of products but an entire 64-bit architecture that spans the high and low end as well as a range of operating systems, he said.

## DEC to deliver last part of DECnet/OSI strategy

By Elisabeth Horwitt  
MAYNARD, MASS.

The final pieces of Digital Equipment Corp.'s DECnet/OSI product are slated to roll out by mid-1993 — approximately six years after the company first announced that Open Systems Interconnect (OSI) would form the basis for its next-generation network architecture.

DEC chose to delay the product in order to incorporate features demanded by customers, such as the ability to perform file transfer, terminal emulation and other services across OSI, Transmission Control Protocol/Internet Protocol and DECnet Phase IV networks, a DEC spokeswoman said. Of prime interest to OSI-oriented DEC users was the delivery of DECnet/OSI for OpenVMS this month — about two years late.

Lawrence Livermore National Laboratory has been waiting to put OSI on its VMS systems — primarily because the international Energy Science Network, in which it participates, is running

out of DECnet Phase IV address spaces, according to Kevin Osterman, a network manager at the laboratory. While DECnet IV has an upward address limit of 64,000 nodes, OSI has virtually unlimited address spaces, Osterman said.

Having tested DECnet/OSI on Ultrix systems, Lawrence Livermore found that it "works pretty well," but it requires more effort to manage than DECnet Phase IV, Osterman said. "OSI is full of functions," such as the ability to administer files remotely. "However, even if you don't need them all, you still have to configure them," he added.

DEC has addressed that problem by providing automated configuration of key DECnet/OSI elements such as the name server and Packetnet System Interface, the DEC spokeswoman said.

The new DEC OpenVMS AXP platform will initially communicate via DEC's proprietary DECnet IV software, which is priced from \$1,200 to \$11,667, depending on the configuration, DEC said. The system will communicate over Ethernet or Fiber Distributed Data Interface.

OpenVMS AXP support for DECnet/OSI is scheduled to be available by mid-1993, DEC said.

DECnet/OSI network software for the OSF/1 version of AXP is slated for March shipment, priced the same as the DECnet IV software.



**In a Business Research Group summer 1992 survey of 400 Fortune 1,000 sites, 13% said they were using some aspect of OSI; of those, OSI comprised 2% of their traffic.**

# COMPUTERWORLD - 51 Issues for \$48.

Yes, I accept your offer. I'll pay just \$38.95\* and receive 51 issues of COMPUTERWORLD -- a savings of \$9.00 off the basic subscription price.

First Name \_\_\_\_\_ MI \_\_\_\_\_ Last Name \_\_\_\_\_

Title \_\_\_\_\_ Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

*NOW  
ONLY  
\$38.95*

Please answer questions below to qualify for this rate.

**2. TITLE/FUNCTION (Circle one)**

**IS/MIS/DP MANAGEMENT**

- 19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
- 21. Dir./Mgr. MIS Services, Information Center
- 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; LAN Mgr., PC Mgr.
- 23. Dir./Mgr. Sys. Development, Sys. Architecture
- 31. Programming Management, Software Developers
- 41. Engineering, Scientific, R&D, Tech. Mgt.
- 60. Sys Integrators/ VARs/Consulting Mgt.

**CORPORATE MANAGEMENT**

- 11. President, Owner/Partner, General Mgr.
- 12. Vice President, Asst. VP
- 13. Treasurer, Controller, Financial Officer

**DEPARTMENTAL MANAGEMENT**

- 51. Sales & Mktg. Management
- 70. Medical, Legal, Accounting Mgt.

**OTHER PROFESSIONAL MANAGEMENT**

- 80. Educator, Journalists, Librarians, Students
- 90. Other Titled Personnel

3. Does your job function require involvement with your company's or your client's computer/information systems/ data processing/communications systems? (Please check only one)

YES    NO

Basic Rate: \$48.00 per year

\*U.S. Only

Address Shown:  Home  Business

E2246-5

(Please specify)

 Recycled Paper



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



**BUSINESS REPLY MAIL**

FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTERWORLD**



P.O. Box 2044  
Marion, Ohio 43306-2144



# YOUR MAINTENANCE BACKLOG IS CONSUMING A LOT MORE THAN TIME.

No one denies the importance of maintaining and enhancing existing systems. They represent an enormous investment of time and money. And remain critical to the operation of most companies. But many IS departments devote so much talent and time to maintenance that they are unable to staff new application development.

Lots of suppliers offer piecemeal solutions, but only KnowledgeWare has a comprehensive strategy to help you streamline maintenance.

KnowledgeWare offers tools designed to dramatically increase your productivity. That allow each programmer to maintain many more applications, whether developed with integrated

CASE or traditional methods. And to help you optimize investments in existing applications by extending their useful life.

KnowledgeWare's Flashpoint™ is the fastest, easiest way to respond to the growing demand for graphic interfaces. Flashpoint allows you to add GUIs to existing applications. Utilizing Flashpoint's "point and click" style, developers quickly accomplish what used to require hundreds, or even thousands of lines of code. This Windows™-based development tool makes your existing inventory of mainframe and midrange programs more accessible to users and is a practical step toward client/server technology.

Dealing with old, error-prone code is radically simplified with ADW®/Inspector™, Pinpoint™ and Recoder™. These advanced maintenance tools read, analyze and document existing COBOL code. Chart processing paths, highlight potential trouble spots and automatically restructure problem code.

These KnowledgeWare products constitute key elements of our redevelopment strategy. And they are even more effective when combined with our Application Development Workbench®, the most comprehensive full-lifecycle, integrated CASE development tool set. Our ADW tools enable you to develop high quality, fully-documented software more quickly and easily than ever before.

And we back these superior tools with comprehensive training and support. Call KnowledgeWare at 1-800-338-4130 for all the details. And stop burning up your company's most valuable resources.



**KnowledgeWare®**

Application Development Workbench and ADW are registered trademarks, and Inspector, Pinpoint and Recoder are trademarks of KnowledgeWare, Inc. Flashpoint is a trademark of Viewpoint Systems, a wholly owned subsidiary of KnowledgeWare, Inc. Windows is a trademark of Microsoft Corporation. ©1992 KnowledgeWare Corporation, all rights reserved.





yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



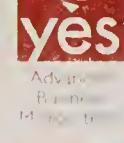
yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



yes



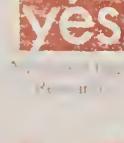
yes



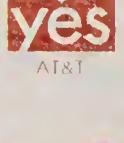
yes



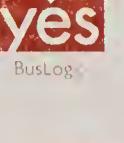
yes



yes



yes



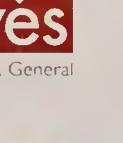
yes



yes



yes



yes



yes



yes



yes



yes



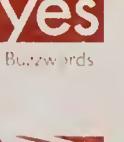
yes



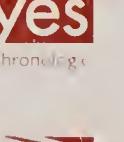
yes



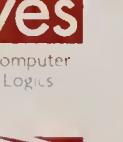
yes



yes



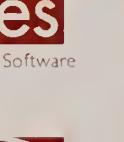
yes



yes



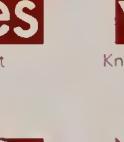
yes



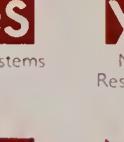
yes



yes



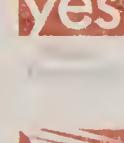
yes



yes



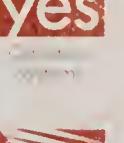
yes



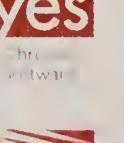
yes



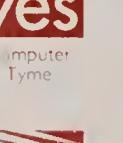
yes



yes



yes



yes



yes</p



In the next few months, you'll notice a bright red "yes" symbol popping up on thousands of hardware and software products. Why? It means each and every one runs with NetWare — the world's leading networking software.

Already, 2,982 products from 429 companies are qualified to display the Novell "yes" symbol. So keep your eyes open for the bright red "yes."

It's one word worth looking for.



The Past, Present, and Future of Network Computing.

FOR MORE INFORMATION CALL 800-NETWAR

## Advanced Technology

Tech  
Talk

## Encyclopedia uses fractals

**M**icrosoft Corp. will stuff a record amount of data into its Encarta CD-ROM encyclopedia. Expected to be released in February, the \$395 reference guide will contain 21,000 articles in 94 categories, 6,500 audio clips for seven hours of digital sound, 100 animations, 800 color maps and 7,000 photos, illustrations and graphs. Microsoft achieved this feat, in part, by using fractal compression technology from Iterated Systems, Inc. for storing color images.

## Four-in-one

**A** team of researchers at the University of California at Irvine has put the power of four reduced instruction set computers into a single chip. The new microprocessor, dubbed Viper, is only 10 by 12mm in size but can perform 100 million instructions per second. The chip design could be used in high-definition television, medical imaging, video phones, computers, advanced fax machines and in-vehicle navigation systems.

## Compression innovation

**I**BM late last month demonstrated a multimedia computer teleconferencing system that cuts the computational overhead associated with processing real-time video images by two orders of magnitude. The IBM prototype "composes" tens of frames into moving pictures while the data is still compressed. Other systems compose frames after the images are decompressed. IBM's system, called Multimedia Multiparty Teleconferencing, reduces the computational requirement for decompressing analog video signals and transmitting them across a local-area network from 100 million operations a second to about 1 million operations a second, or within the range of current PC chips. The prototype system involved IBM Personal System/2 Model 95s running IBM's AIX Unix implementation and linked over a high-speed LAN.

## Enabling multimedia

As prices of digital signal processors fall, applications emerge

By Ellis Booker

**M**ULTIMEDIA COMPUTING — the integration of sound, image and video on the desktop — would not be possible without them, yet few users know what they are.

*They* are digital signal processors (DSP), the bridge between the "real world" of sounds and sights and the digital realm of bits and bytes. And they are becoming cheaper and more common.

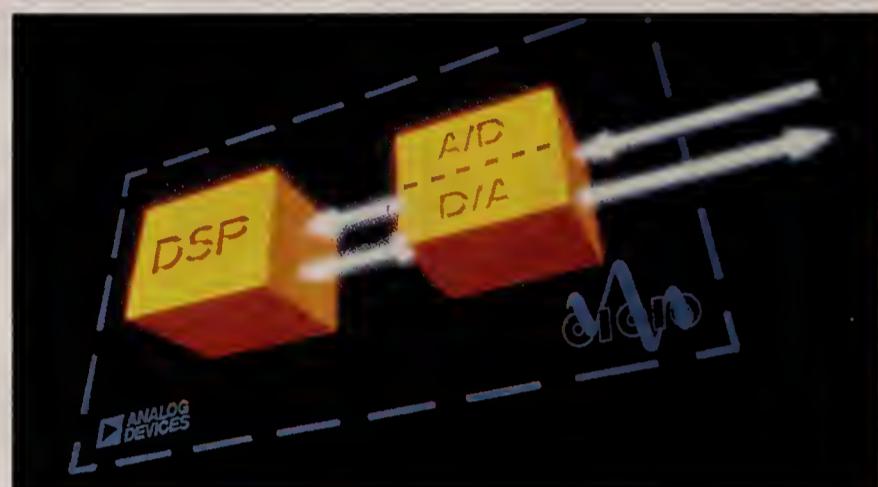
DSPs can be understood, simply, as very fast translators that take analog signals from the outside and convert them into bit streams that a computer can understand. In addition, DSPs compress the arriving signals — in the case of video, for instance, crunching the incoming pictures at ratios of 100 to 1.

"DSP technology is the enabling technology for all multimedia," said Will Strauss, president of Forward Concepts Co., a market research company in Tempe, Ariz.

## Lucky 13

But if multimedia is new, DSP technology is not. The world's first single-chip, programmable DSP was introduced by Intel Corp. in 1979. The 2920, as it was called, could filter, convolve and analyze audio signal waveforms. But sales did not meet expectations, and Intel abandoned the DSP market to the likes of Texas Instruments, Inc., which retains a market leadership role in this part of the semiconductor business.

But the most significant change has been falling prices for these specialized chips, which has brought them out of high-priced military and networking products. For instance, one class of TI chips dropped from



Digital signal processors take analog signals and translate and compress them for computers

\$300 apiece a decade ago to \$15 today, while it increased in horsepower from 5 million instructions per second (MIPS) to 40 MIPS.

A watershed event came when Rockwell International Corp. introduced a DSP chip set for 1,200 bit/sec. modems.

"The greatest quantity, both in units and dollars, is still in modem chips," Strauss said. But he said he expects DSP-based hard disk controllers — used to optimize the spacing of bits on the disk as well as adaptively correct for damaged disk sectors — will pass modem DSP sales in 1993. The reason for this is the shrinking size and increasing storage capacity of hard disks.

"We'd like to think the watershed was 2½ years ago, when we introduced a \$9.90 DSP," said Bill Schweber, marketing engineer at Analog Devices, Inc. in Norwood, Mass.

Along with falling unit prices, Schweber said, applications have evolved to take advantage of sound and video. He pointed out that Microsoft Corp.'s Windows 3.1, for example, comes with icons for audio record and playback to support voice annotation to a text document.

Many observers said 1993 will be the year that audio begins to be seriously integrated into general-purpose computer applications.

Meanwhile, DSPs to support full-motion, full-screen video (defined as full frames at 30 frame/sec.) are being announced left and right.

As general-purpose chips get faster and faster, will there continue to be a need for DSP?

Analysts said they think so, noting that general-purpose chips are not optimized for signal conversion/compression and decompression. Rather than putting these tasks into general-purpose chips, DSPs will, they predict, get faster (i.e., able to handle multiple billions of calculations per second) and perform even more impressive, real-time compression. Compression is key, many observers said, because networks are the chief bottleneck in multimedia computing.

## Common multimedia terms

**Digital Video Interactive (DVI)**: Intel's proprietary image compression and expansion scheme. In 1993, the industry is expected to move to the MPEG-1 standard for real-time video.

**Motion Picture Experts Group (MPEG or MPEG-1)**: A standard for 100-to-1 video compression from a U.S. standards group.

**Joint Photographic Experts Group (JPEG)**: A standard for 15-to-1 still-image compression.

**Function and Algorithm Specific IC (FASIC)**: Nonprogrammable DSPs used in video coder/decoders (codec) and modems.

## DSP products

At Comdex/Fall '92 this month, IBM and TI will show MWave, a jointly developed DSP able to handle audio (record and playback), modem and fax and still-video compression using the JPEG specification.

IBM has said this chip will be standard in all its Personal System/2 Ultimmedia branded products next year.

AT&T Microelectronics, meanwhile, is reportedly sampling a full video codec on a chip that is aimed at desktop-to-desktop video teleconferencing. AT&T already has a base multimedia chip, the DSP3210, that provides low-level voice, modem and fax functions. Several vendors — including Apple Computer, Inc. and Commodore business Machines, Inc. — will announce support for the AT&T chip at Comdex.

In the beginning, only hackers cared about UNIX.

Now it's ironic to see gaggles of suits  
trekking down to IS asking the gurus about UNIX.  
**"Will it save our company?" they plead.**

And hackers (we mean IS professionals),  
weary of flaming the clueless *veebefesters*,  
shouldn't be faulted for wondering what took so long.

(All at once now: "What took management so long to *get* UNIX?")

Anyone with an IQ above room temperature knows that the hostile  
takeovers, LBOs, and "consolidations" of 1980's-style  
**attack capitalism finally caught up with everyone.**

Efficiency is now in fashion.

Right-sizing is in vogue.

Now people *need* UNIX because it makes applications and data  
portable to platforms of vastly different scale.

So companies can rebuild while vastly reducing costs.

Those who have tried it are very happy with UNIX.

The hackers in the IS department are happy, too,  
because they can finally stop being computer paleontologists  
and go back to advancing computer science.

Live free or die!

Dun & Bradstreet Software is pleased to announce **Millennium<sup>®</sup> UNIX**.  
Fully functional financial and materials management packages for  
the most widely used multi-user, general-purpose operating system  
in the world. Call now, 404-239-INFO\*.

\* advTHANKSance (TIA, or Thanks in Advance) for calling.

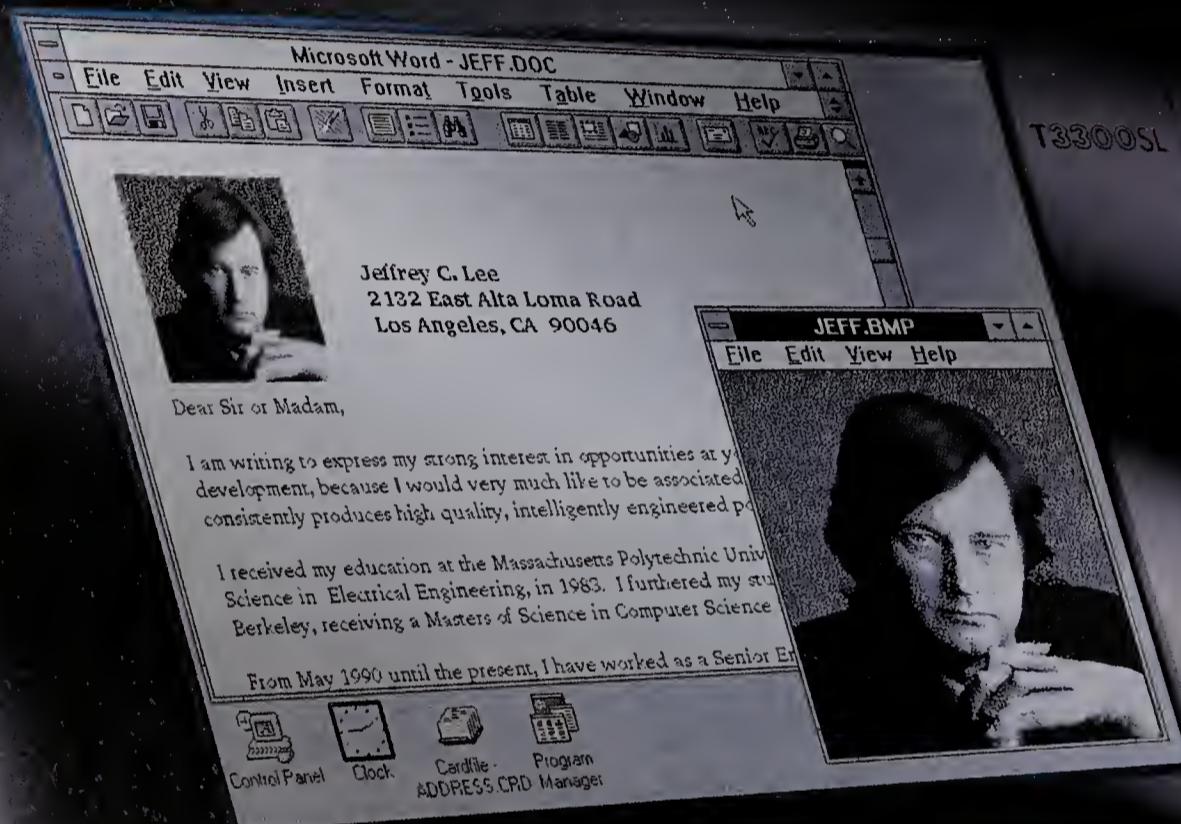
Offered in cooperation with Data General Corporation,  
Digital Equipment Corporation, Hewlett-Packard Company,  
and International Computers Limited.

UNIX is a registered trademark of UNIX Systems Laboratories, Inc.

**D&B SOFTWARE**  
Dun & Bradstreet Software

DB a company of  
The Dun & Bradstreet Corporation

IF YOU CAN FIND ANYTHING WE'VE  
PLEASE SEND YOUR RESUME TO



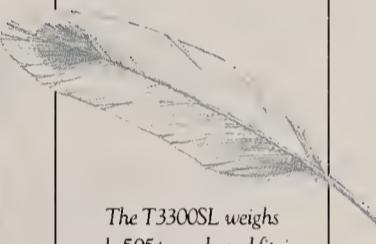
THE TOSHIBA T3300

# OVERLOOKED, ENGINEERING.



August 1992  
Toshiba T3300SL

In PC Magazine's  
survey of 65 notebooks,  
guess who received Editors'  
Choice honors.



The T3300SL weighs  
only 5.95 pounds and fits in  
half a briefcase. (Leaving  
plenty of room for your  
tuna sandwich.)



You can call real  
live Toshiba technicians  
toll-free for complete  
product support.



They say nothing's perfect.

We say, they haven't seen our T3300SL.

The notebook that leaves so little room for improvement, the editors of PC Magazine named it one of their Editors' Choices for 1992.

From its bright, easy-to-read LCD screen to its light-as-a-feather weight, the T3300SL may very well be the best-designed 386 notebook you can buy.

And mind you, by "best-designed," we don't just mean "most features."

By "best-designed," we mean a combination of technology that's been chosen because it's even more impressive in the real world than it is on paper.

Our engineers gave this Toshiba a rapid fire 25 MHz 386SL microprocessor, a PCMCIA slot, and your choice of an 80MB or 120MB hard drive, not to mention all the other qualities that make a Toshiba a Toshiba. Namely, standard size keys with full key travel. Compatibility with our DeskStation IV. And Maxtime™ power management, which lets you get the most out of yet another virtuous feature: a powerful Nickel Hydride battery.

So like we said, if you can build a better balanced 386 notebook, talk to Engineering. And if you can't, talk to your nearest Toshiba dealer. The toll-free number is below.

(Surely you didn't think we'd overlook that, did you?)

In Touch With Tomorrow.

**TOSHIBA**

1 - 8 0 0 - 4 5 7 - 7 7 7

© 1992 Toshiba America Information Systems, Inc. The Intel Inside logo is a trademark of Intel Corporation.  
All products indicated by trademark symbols are trademarked and/or registered by their respective manufacturers.

## Editorial

## In with the new

For the past 10 months, we've affixed a "New in '92" label to various revisions and additions appearing in *Computerworld*. Change is a fixture in our world and the one we write about. And we've been meeting the changes in the paper bit by bit during the year.

Today's issue by contrast is the greatest manifestation of change at this newspaper. But before I run down the specifics, let me first tell you why we've revised our design, and why change is the only constant here.

First and foremost, the needs of our readership are fast-evolving. In a nutshell, your information needs are greater than ever while the time you can devote to professional reading remains the same—at best. You, the reader, need more information but cannot allocate any more time to absorb it.

Change in the information technology environment is also utterly breakneck. Intel's next-generation microprocessor will pack almost 100 MIPS on a single chip. That's 10 times the raw power found in the mainframes of less than a decade ago. Keeping up with such change is a job in itself.



So we've changed. For one thing, we look much different. Our new design speeds you through more of the paper in less reading time, and we're now using a higher quality paper stock. For a full explanation of this most apparent difference, see page 4.

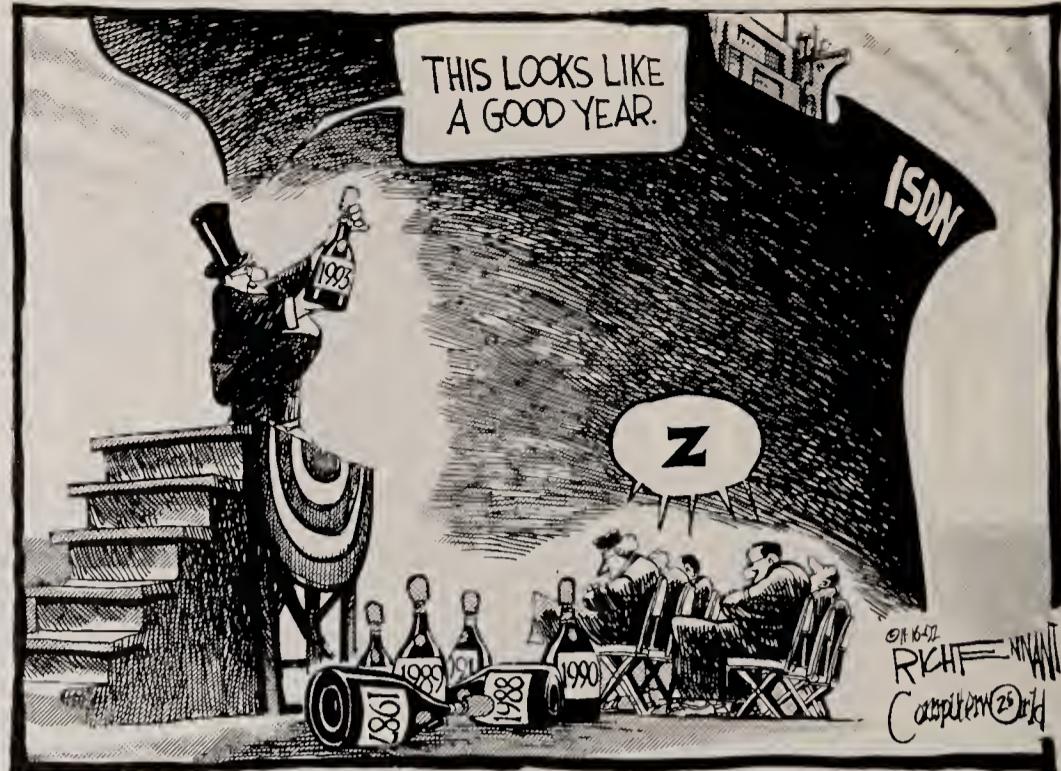
We're also featuring a company index, an expanded executive briefing page and a newly fashioned management section targeting senior IS managers. And we are adding a group of "marquee columnists," who include the following:

- Esther Dyson, without question among the most highly regarded industry observers in the world and editor of the "Release 1.0" newsletter.
- John Gantz, head of desktop and workgroup computing research at International Data Corp., former chief analyst at Dataquest and oft-quoted industry commentator.
- Michael Schrage, a foremost authority on the interplay of technology and human behavior, as well as a noted author and research associate at MIT's Sloan School of Management.
- Elaine Bond, longtime CIO at The Chase Manhattan Bank and senior technology consultant and founder of Open Users Recommended Solutions, a user advocacy group.
- Charles Babcock, our new technical editor and former editor in chief at *Digital News*, who will write a weekly technology column.

These and other revisions have a singular goal in mind: to provide you, the reader, with more value for your money and reading time. I'd love to know if we are on the mark, in your esteemed opinion. I'm reachable through various means, as listed on this page.

*Bill Laberis*

Bill Laberis, *Editor in chief*



## Letters to the editor

## Thief wanted car, not laptop

Your Page One story "Laptop thefts spur security efforts" [CW, Oct. 12] asserts that thieves made off with Gen. Norman Schwarzkopf's laptop containing battle plans for the invasion of Iraq. It did not happen.

What did happen is that on Dec. 17, 1990, a Royal Air Force wing commander, David Farquhar, stopped by a downtown London auto showroom to look around. While in the showroom, someone stole Farquhar's car along with the laptop he left in the trunk. The laptop's hard disk contained details of the Iraq invasion.

The computer was returned a week later, with information intact, after the theft was widely reported in English newspapers. Farquhar subsequently was court-martialed, demoted and fined.

Michael Alexander  
Framingham, Mass.

## Managers must respect workers

Joshua Hammond's informative viewpoint article, "Hard and fast truths about quality" [CW, Oct. 26], hits the nail on the head. He states, "Our greatest untapped potential for improvement ... lies in the underutilized energy and resourcefulness of the American people."

American managers must look in a mirror and ask ourselves if we are providing the leadership necessary for all employees to grow and reach their fullest potential. If the answer is no, then we're looking at the answer.

Once all employees experience the satisfaction of success and the praise and recognition that they earn, total quality management will become an irreversible way of life.

Roger Dwyer  
Winthrop, Maine

Joshua Hammond writes in his article [CW, Oct. 26]:

- Quality puts people before technology.
- The "greatest untapped potential for improvement lies not in technology or better processes but in the underutilized energy and resourcefulness of the American people."

Thank you, thank you, thank you! If just one manager now understands this, you've sure earned your keep!

Karl M. Waldman  
BBN Systems and Technologies

## All hands are needed on DEC

Your editorial "DEC, take 2" [CW, Oct. 19] was very good and well received, I'm sure.

It is evident that DEC has taken some wrong turns in downsizing itself. At my company, RJR Tobacco in Winston-Salem, N.C., we have felt the impact of DEC's effort to cut costs in its field service division.

The turnaround time on service calls has increased, causing us to look at taking over some of the maintenance ourselves.

DEC must take a hard look at its downsizing effort. You are right: "Without question, DEC is at the most critical juncture in its 35-year history."

Thomas Renn  
Systems technical specialist  
Winston-Salem, N.C.

## Help wanted?

I read in disbelief about the support that Gov. Clinton received from the executives of the high-tech companies ["High-tech backing," CW, Oct. 26].

I know President Bush is not a capitalist (i.e., he is not a defender of individual rights), but he does not have an explicit policy that seeks to control the high-tech industries; Clinton does.

It looks as if the high-tech leaders are looking for "help," and the only "help" the government can give is protectionism and subsidies.

I don't think they realize that this is the same "help" given to the many industries wracked by government intervention, including the automobile, steel, banking and savings and loan industries.

Many firms in those industries were once world-class, and American firms dominated the world's Top 10 lists. Today, they frequently cannot compete in the markets they created. If this kind of "help" is sought by the high-tech industry, it can expect similar results.

Thomas Fahrner  
San Jose, Calif.

■ COMPUTERWORLD WELCOMES COMMENTS FROM ITS READERS. LETTERS MAY BE EDITED FOR BREVITY AND CLARITY AND SHOULD BE ADDRESSED TO BILL LABERIS, EDITOR IN CHIEF, COMPUTERWORLD, P.O. Box 9171, 375 COCHITIATE ROAD, FRAMINGHAM, MASS. 01701. FAX NUMBER: (508) 875-8931; MCI MAIL: COMPUTERWORLD. PLEASE INCLUDE A PHONE NUMBER FOR VERIFICATION.

# More Up-to-the-Minute News!

51 Issues for ~~\$48~~ NOW ONLY \$38.95

Yes, I want more. I accept your offer of \$38.95\* for 51 weekly issues.  
That's a savings of over \$9.00 off the basic subscription rate.

First Name \_\_\_\_\_ MI \_\_\_\_\_ Last Name \_\_\_\_\_

Title \_\_\_\_\_ Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Address Show:  Home  Business  New  Renew Basic Rate: \$48 per year

\*U.S. Only. Canada \$74.97, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information below to qualify for this special rate.

1. BUSINESS/INDUSTRY (Circle one)

- 10. Manufacturer (other than computer)
- 20. Finance/Insurance/Real Estate
- 30. Medicine/Law/Education
- 40. Wholesale/Retail/Trade
- 50. Business Service (except DP)
- 60. Government - State/Federal/Local
- 65. Communications Systems/Public Utilities/Transportation
- 70. Mining/Construction/Petroleum/Refining/Agric.
- 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90. Computer/Peripheral Dealer/Distr./Retailer
- 95. Other \_\_\_\_\_

(Please specify)

2. TITLE/FUNCTION (Circle one)

- IS/MIS/DP MANAGEMENT
- 19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
  - 21. Dir./Mgr. MIS Services, Information Center
  - 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; LAN Mgr., PC Mgr.
  - 23. Dir./Mgr. Sys. Development, Sys. Architecture
  - 31. Programming Management, Software Developers
  - 41. Engineering, Scientific, R&D, Tech. Mgt.
  - 60. Sys. Integrators/ VARs/Consulting Mgt.
- CORPORATE MANAGEMENT
- 11. President, Owner/Partner, General Mgr.
  - 12. Vice President, Asst. VP
  - 13. Treasurer, Controller, Financial Officer

## COMPUTERWORLD



DEPARTMENTAL MANAGEMENT

- 51. Sales & Mktg. Management
- 70. Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT

- 80. Educator, Journalists, Librarians, Students
- 90. Other Titled Personnel

3. Does your job function require involvement with your company's or your client's computer/information systems/data processing/communications systems?  
(Please check only one)

YES  NO

E4246F-6

# More Desktop Computing!

51 Issues for ~~\$48~~ NOW ONLY \$38.95

Yes, I want more. I accept your offer of \$38.95\* for 51 weekly issues.  
That's a savings of over \$9.00 off the basic subscription rate.

First Name \_\_\_\_\_ MI \_\_\_\_\_ Last Name \_\_\_\_\_

Title \_\_\_\_\_ Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Address Show:  Home  Business  New  Renew Basic Rate: \$48 per year

\*U.S. Only. Canada \$74.97, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information below to qualify for this special rate.

1. BUSINESS/INDUSTRY (Circle one)

- 10. Manufacturer (other than computer)
- 20. Finance/Insurance/Real Estate
- 30. Medicine/Law/Education
- 40. Wholesale/Retail/Trade
- 50. Business Service (except DP)
- 60. Government - State/Federal/Local
- 65. Communications Systems/Public Utilities/Transportation
- 70. Mining/Construction/Petroleum/Refining/Agric.
- 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90. Computer/Peripheral Dealer/Distr./Retailer
- 95. Other \_\_\_\_\_

(Please specify)

2. TITLE/FUNCTION (Circle one)

- IS/MIS/DP MANAGEMENT
- 19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
  - 21. Dir./Mgr. MIS Services, Information Center
  - 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; LAN Mgr., PC Mgr.
  - 23. Dir./Mgr. Sys. Development, Sys. Architecture
  - 31. Programming Management, Software Developers
  - 41. Engineering, Scientific, R&D, Tech. Mgt.
  - 60. Sys. Integrators/ VARs/Consulting Mgt.
- CORPORATE MANAGEMENT
- 11. President, Owner/Partner, General Mgr.
  - 12. Vice President, Asst. VP
  - 13. Treasurer, Controller, Financial Officer

## COMPUTERWORLD



DEPARTMENTAL MANAGEMENT

- 51. Sales & Mktg. Management
- 70. Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT

- 80. Educator, Journalists, Librarians, Students
- 90. Other Titled Personnel

3. Does your job function require involvement with your company's or your client's computer/information systems/data processing/communications systems?  
(Please check only one)

YES  NO

E4246F-6

NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

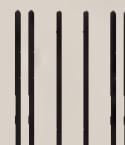
**BUSINESS REPLY MAIL**

FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTERWORLD**

P.O. Box 2044  
Marion, Ohio 43306-2144



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTERWORLD**

P.O. Box 2044  
Marion, Ohio 43306-2144



Editor in Chief  
Bill Laberis  
Executive Editor  
Paul Gillin  
News Editor  
Alan Alper  
Technical Sections Editor  
James Connolly  
Assistant News Editor  
Patricia Keele  
Technical Editor  
Charles Babcock  
Senior Editors  
Elisabeth Horwitz  
Networking  
Rosemary Casafio  
Personal Computing  
Neil Margolis  
Management  
Maryfran Johnson  
Workstations  
Joanie M. Wexler  
Networking  
Johanna Ambrosio  
Systems & Software  
Garry N. Ray  
Application Development  
Ellis Booker  
Advanced Technology  
Senior Writers  
Michael Fitzgerald  
Melinda-Carol Ballou  
Staff Writers  
Kim S. Nash  
Lynda Radosevich  
New Products Writer  
Lisa Davidson

Features Editor  
Joanne Kelleher  
Senior Editors  
Joseph Maglitta  
Lori Zottola Dix  
Mary Grover Brandel  
Joyce Chuchian Ferranti  
Associate Editor  
Carol Hildebrand  
Assistant Editors  
Jodie Naze  
Kelly E. Sewell  
Assistant Researcher  
Stefanie McCann  
Columnist  
Jesse Berst  
Research Manager  
Michael L. Sullivan-Trainor  
Research Coordinator  
Kevin Burden  
Product Research Coordinator  
Derek Slater  
Chief Copy Editor  
Catherine Gagnon  
Assistant Chief Copy Editor  
Anne McCrory  
Features Copy Editors  
Kimberlee A. Smith  
Steven J. Condon  
Copy Editors  
Alice Lesch Kelly  
Stephen P. Klett Jr.  
Christina Aicardi Maguire  
Jill Zolot

Design Director  
Nancy Kowal  
Graphics Designer  
Tom Monahan  
Design Assistant  
Janell Genovese  
Graphics Specialists  
Michael Siggins  
Stephanie Faucher  
Cartoonist  
Rich Tennant

Office Manager  
Linda Gorgone  
Editorial Assistants  
Lorraine Witzell  
Connie Brown  
Aleksandra Skulite  
Rights and Permissions Manager  
Sharon Bryant  
Back Issues  
Margaret McIndoe  
News Bureaus  
Mid-Atlantic  
(201) 967-1350  
Thomas Hoffman, Correspondent  
Washington, D.C.  
Mitch Betts, National Correspondent  
(202) 347-6718  
Gary H. Antes, Senior Correspondent  
(202) 347-0134  
West Coast  
(415) 347-0555  
Jean S. Bozman  
Senior West Coast Editor  
James Daly  
Senior Correspondent  
Mark Halper  
Senior Correspondent  
Christopher Lindquist  
Correspondent  
(801) 328-2425  
Michele Dostert  
Correspondent  
Chris Flanagan  
Editorial Assistant

Midwest  
(708) 827-4433  
Ellis Booker  
Bureau Chief  
Main Editorial Office  
Box 9171, 375 Cochituate Road  
Framingham, Mass. 01701-9171  
(508) 879-0700  
MCI Mail: COMPUTERWORLD  
Subscriptions: (800) 669-1002

# The great glamour accessory

Bruce Sterling



helps me get people's attention, that's why.

Thanks to computer networking and the global phone system, I can now, with very little effort or expense, thrust myself into the lives of hundreds, maybe thousands, of people just by posting a comment, uploading a file or sending a fax.

The downside of this swell situation is that almost anyone, in return, can reach out and touch me. I already get 90 pieces of E-mail a week. The fax hums regularly, too. And I can tell that the computer network scene is getting smarter, faster and more thoroughly electric.

If you think it's hell handling the fierce demands of human beings for attention, wait till the computers are tirelessly hanging on your phone, sending autonomous mail, collecting debts, nar-

row-casting junk faxes and gladhanding you.

Computers are eating up our time and attention — not just in our business lives but in every aspect of our lives, including, by design, our most personal ones.

Consider this strange phenomenon: There are guys burning megabuck access time right now, downloading racy GIF files from X-rated bulletin-board systems. Many, maybe most, of these graphic images are scanned and stolen from traditional print skin magazines.

It doesn't matter that the magazine images are better in every way; computer people pay huge sums to get these images in their computers. Why? They want these tacky glamour shots inside their computers right now, that's why! It's as simple, and as utterly compulsive, as that.

Computers are no longer "logical" or "rational." They're too close to us now; there's too much of us inside them. They're full of juice and blood and law and art and politics and paradox and deep, profound, nonlinear treachery.

For some people — the smart, the ambitious, sometimes the strange and the dangerous — they're becoming the place you can stick a crowbar and move the world.

Sterling is a best-selling science fiction author. His latest book, *The Hacker Crackdown*, is a nonfiction description of "law and disorder on the Electronic Frontier."



# Comdex: Why efficiency is beside the point

OPEN MIND by Esther Dyson

Comdex is like the real world, but more so. It's large and inefficient, and there's lots of stuff there — if you could only find it. Most things are either free (bite-size quiches and product literature), overpriced (limos and decent food) or unavailable (rooms at the Hilton). Particular people are impossible to reach, yet you run into long-lost friends in every waiting line.

Any software vendor worth its salt could figure out how to make Comdex more efficient. Create an on-line catalog of firms, products and attendees, add a scheduling program and use a linear optimization program (and perhaps a Cray supercomputer). Everyone would be on-line, with beepers and E-mail, and would be able to reach anyone.

This raises interesting questions: What would the trade-offs be? How do you value Bill Gates' time, as opposed to Fred Bloggs'? Maybe you could design an algorithm that would equalize things by having thousands of people listen to Bill at the same time. . . . Of course, that's precisely what happens during the keynote speeches — all without benefit of software.

But Bill Gates isn't the only one. Many people's time is too valuable (to them, at least) to allocate fairly. Vendors want to see buyers and reporters

more than the buyers and reporters want to see the vendors. Thus, because this is a market (of sorts), the sellers offer bribes — bite-size quiches, rock concerts or the company of the buyers' peers at some Las Vegas-ritzy location.

In fact, Comdex is a lot more efficient than it looks. There's no central computer, but a lot of local units make calculations and trade-offs, balancing expenses against expected returns. Still, if you factor in the enormous extra costs — time spent waiting in line, travel expenses, fruitless conversations — the whole experience may cost a lot more than it returns to many players.

In the end, the best way to explain Comdex is — appropriately — the lottery. Comdex is ultimately a gamble.

At Comdex and in the real world, people don't really want an efficient slot machine or a market; they want one that lets them win from time to time. The real lure of Comdex is the possibility of a special discovery — the product no one else has noticed, the chance visit from the head of MIS at Chase or Boeing or DHL, the reporter's seat on the bus next to a garrulous insider after his fifth drink or the vendor's seat next to the credulous reporter who'll help spread misinformation about a competitor.

People remember their wins, not their losses.

For me, one win came when I was standing alone outside the Sands, waiting for a taxi that wasn't coming. A man joined me. I offered to share my taxi if it ever came. As it happened, the man was John Kelley, who runs the Congressional Research Service effort to provide computers and know-how to East European parliaments. It was through him that I met Mirek Priban and Zdenek Malina of the Czechoslovakian Parliament (hi, guys!) who are attending Comdex this year in hopes of . . . who knows?

Which reminds me of my all-time favorite Comdex story — guaranteed true.

It happened last year when Mitch Kapor took a taxi in from the airport. "You here for this Comdex show?" the driver asked.

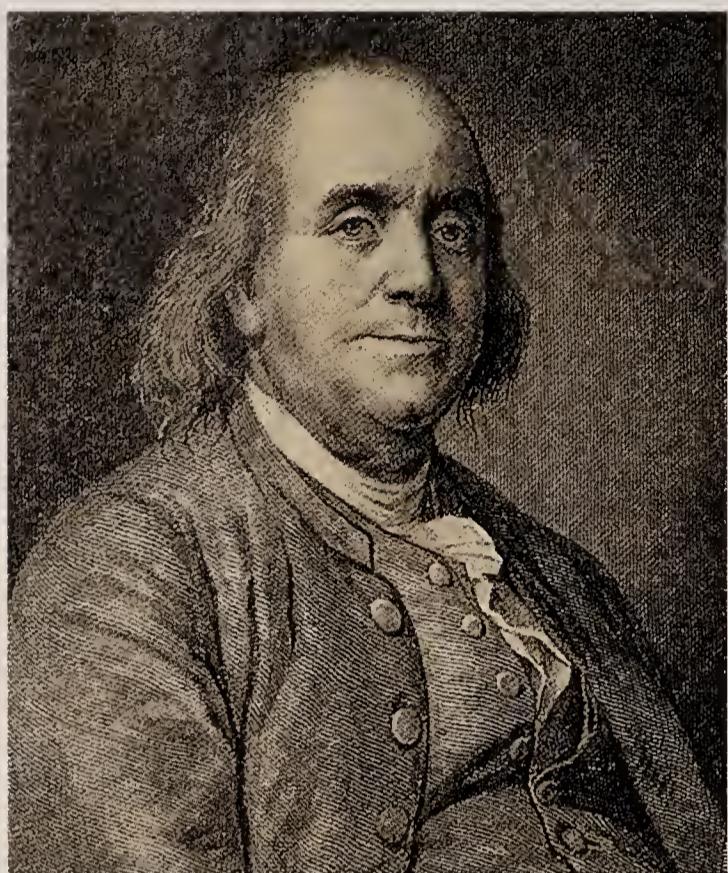
"Yup," Kapor replied.

"So whaddaya do?" the driver asked.

"I'm in software," Kapor said.

"Oh," said the driver, peering around to look. "Are you Bill Gates?"

Dyson is editor of "Release 1.0" and "Rel-EAST," newsletters on new technology and new computer markets in Eastern Europe, respectively.



*“Electrifying idea, my boy.”*  
Benjamin Franklin



*“Thou art a superb writer”*  
Shakespeare



*“Music to my ears.”*  
Wolfgang Amadeus Mozart



*“Best digital private line”*  
*“Best 800 services”*  
*“Best Frame Relay”*  
*“Best ISDN Services”*  
*“Best Switched Digital Services”*  
*“Best Virtual Network Services”*

Network World Reader

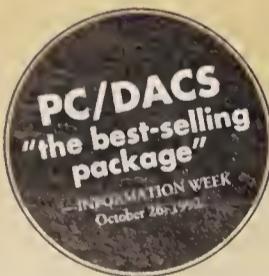
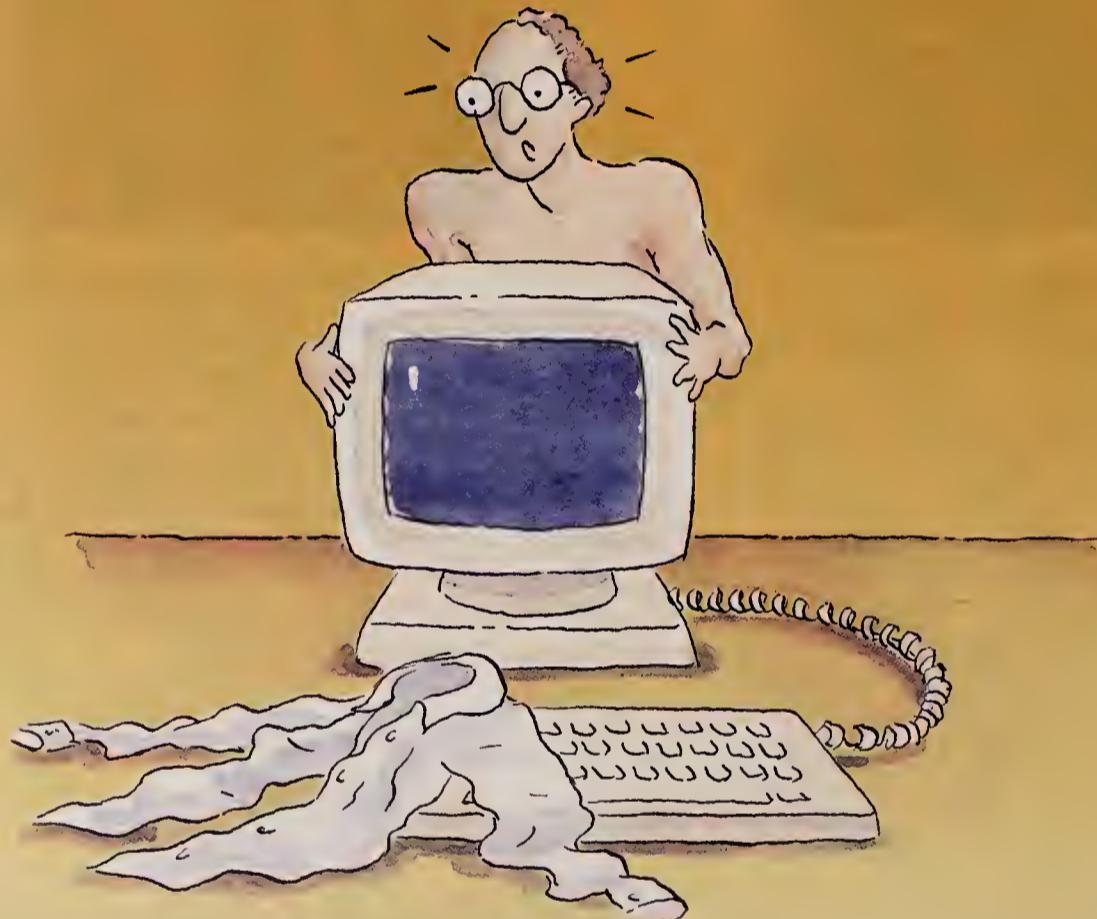
## Hearing it from an expert makes all the difference in the world.

What if William Shakespeare told you your writing was superb? Or Ben Franklin admired your ideas? That's how we felt when the readers of Network World agreed we were #1 in 6 categories,\* made up of voice and data services, in this year's reader's poll.

Network World readers know telecommunications and know it well. The votes they cast are tough votes to earn. And that makes all the difference in the world.

 **AT&T**  
The right choice.

IF YOU DON'T GET  
**SECURITY**  
FOR OS/2 2.0  
**NOW**  
YOU COULD  
LOSE MORE  
THAN YOU THINK.



**PC/DACS for OS/2.  
The FIRST version 2.0 software security system.  
AVAILABLE NOW.**

PEOPLE and the INFORMATION they create and process are the two most important assets your company has. You know it. And because the success of your enterprise depends upon making the most of your assets, you're committed to using the best information processing technologies and protecting against information breaches that could cost you the shirt off your back.

Improving your business by enhancing productivity and protecting your competitive edge... That's why you updated to OS/2 and that's why you need to incorporate PC/DACS, the *best* workstation information security solution, into your business-critical computing operations.

PC/DACS has powerful, transparent infosecurity capabilities that will preserve the *integrity*, *confidentiality*, and *availability* of your valuable information assets. With PC/DACS you'll protect, not stifle, the creativity and innovation of your organization.

At every turn, PC/DACS foils unauthorized users. Its multi-level security provides user identification and authentication, session time out, encryption and boot protection. With PC/DACS on the job, you can spend more time improving your business and less time worrying about losing your competitive edge.

Call us today to find out more about our integrated infosecurity solutions for evolving corporate computing environments. We're the world's leading supplier of workstation and network security software systems for OS/2®, DOS®, Windows® and Novell® networks. When it comes to security, we've got you covered.

**Call NOW to get TODAY,  
what you needed YESTERDAY,  
to protect your success TOMORROW!**



PYRAMID Development Corporation  
70 Inwood Road  
Rocky Hill, CT 06067  
203-257-4223 Fax: 203-257-4245

## Wireless notebooks next in line

By Michael Fitzgerald

As notebook computer vendors begin to make color an everyday option, wireless communications becomes the next technology frontier.

A series of recent color notebook introductions has set the stage for the next round of features — new communications capabilities.

Compaq Computer Corp., for instance, now offers a 14.4 bit/sec. SpeedPaq 144 Modem, which is the first data/fax modem to connect directly to cellular phones. Users of Motorola, Inc.'s MicroTae and Mi-



croTec Lite families and Nokia Mobile Phones, Inc.'s 121 can use their phones with the SpeedPaq, which costs \$649.

AST Research, Inc. has chosen to support cellular communications by installing Personal Computer Memory Card Interface Association (PCMCIA) slots in its PowerExec family of notebooks [CW, Sept. 21].

"It's a blemish not to have PCMCIA at this point — there's an explosion of PCMCIA cards coming," said Leslie Fiering, analyst at the Gartner Group, Inc. in Stamford, Conn.

## Not convinced

Notebook vendors say problems with cellular data transmission methods will be greatly reduced through use of the MNP10 error-correcting protocol, but analysts doubt the protocol will be a panacea. "The general public is going to find out that connecting over cellular is harder than connecting over regular phone lines," said Andrew Seybold.

At the same time, Fiering said notebook vendors could get away without offering PCMCIA cards, which will really not become widely available until next year. Andrew Watson, director of portables marketing at Compaq North America, said that was the major factor in his company's not introducing PCMCIA in its machines yet.

"We have the luxury of waiting until PCMCIA is widespread because we've published the spec on our option slot, and vendors have built cards for it," Watson said. However, he acknowledged that Compaq will "have to make a clean break" to PCMCIA in the future.

Daniel D. Sheppard, director of product marketing at AST, acknowledged that "Q1 next year is when the PCMCIA issue ends." But he said the open standard it establishes will drive far more options for notebooks than exist today.

## In the lead

AST's six new notebooks greatly expand the company's PowerExec family, and analysts praised the vendor for refreshing its hot-selling Premium Exec notebook family as the market shifted. They added that the breadth of the announcement at least temporarily put AST ahead of Compaq and probably Toshiba America Information Systems, Inc. as well.

"They've taken a winner of a design," said one analyst. "Notebooks, page 39

## Oracle charts own course with Glue

By Jean S. Bozman

REDWOOD CITY, CALIF.

Oracle Corp.'s recent launch of its Oracle Glue application programming interface (API) neatly sidesteps a potential conflict with software rival Microsoft Corp., industry analysts said. Glue is intended to spur development of Microsoft Windows programs that tap into Oracle database servers; it works without relying on Microsoft's Open Database Connectivity (ODBC) API.

Oracle Glue 1.0's architecture (see chart) provides an alternative to Microsoft's ODBC client/server interface. Oracle has promised to support ODBC but said Glue will not support ODBC until the third quarter of 1993. Meanwhile, Oracle is reportedly working with Microsoft on a separate product, a low-level driver for ODBC.

"It's a sign that open systems are coming to the database world," said Judith Hurwitz, president of the Hurwitz Consulting Group in Newton, Mass., a market research firm that tracks software tools. "Oracle is realizing that the client market can help them sell a lot of database engines. But a company like Oracle has nothing to gain by being closer to Microsoft than to Novell. They could be buddies with everybody."

Glue approaches connectivity at a high level of abstraction, analysts said. It uses another Microsoft product, Dynamic Linked Library (DLL), to translate commands into server calls. "This means you don't need to buy a gateway to get to a database," said David McGoveran, president of Alternative Technologies in Boulder Creek, Calif. "Oracle had to do some

serious design work to create a general-purpose API." DLLs are widely supported by PC application vendors, he said.

Developers can use Glue with Microsoft's Visual Basic and Excel programming environments, pasting in Glue commands such as ExecSQL, for example, to reach target databases. Supported servers will be connected to clients via Oracle's SQL Net communications software and SQL Connect gateways. Glue Version 1.0 also supports any Microsoft Dynamic Data Exchange application, such as Lotus Development Corp.'s 1-2-3. Future Glue versions will add support for several electronic-mail file servers and personal digital assistants such as Apple Computer, Inc.'s Newton.

Oracle Glue was developed by Oracle's New Technology Division, which also developed the Oracle Card application builder for Windows and Apple Macintoshes and the older Oracle Access method for client/server applications. "Glue is an adaptable, portable, integrated API that works with many tools and many platforms," said Marc Benioff, vice president of Microsoft's NT unit. "It's an API to the APIs."

Among databases supported by Glue Version 1.0 are those

from Oracle, IBM's DB2, Tandem Computers, Inc.'s NonStop SQL and Borland International, Inc.'s Paradox and dBase. Future versions will support Oracle competitor Sybase, Inc.'s SQL Server database and Microsoft's SQL Server for OS/2. The basic Glue tool kit is priced at \$2,995 and is slated to be available from Oracle's direct-sales force in April of next year. The tool kit price includes a license for unlimited runtime versions of Oracle Glue. However, there is an additional \$899 yearly maintenance fee for upgrades and support.

## Security Check

James Daly

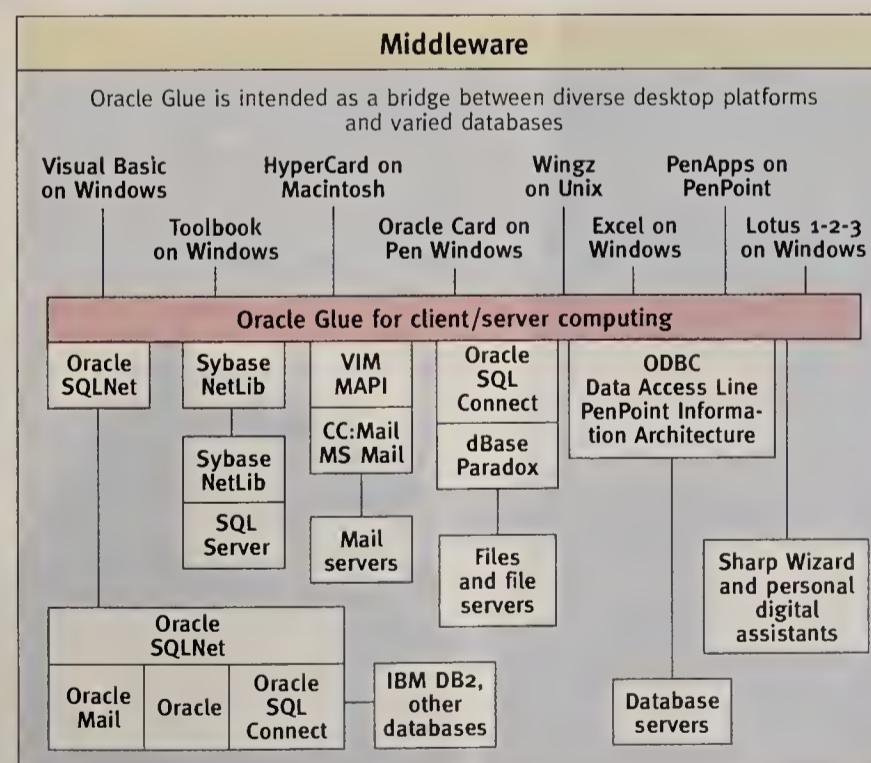
Virus  
paranoia

When paranoia reigns, gullibility follows.... It looks like a Philadelphia TV station got hornswoggled pretty well last month. The station began reporting on a mysterious virus named "Oliver," set to hit Oct. 13, when it would wipe out hard disks and display politically incorrect messages. The station quoted a representative from a suburban computer consultancy and ran several segments about Oliver on the morning news. Oct. 13 came and went, and there were no reports of the enigmatic virus.

Computer-literate viewers were befuddled: Although there is one obscure virus named Oliver, it has no known activation date. Then the lights began to dawn. Seems that the TV station's limited description of Oliver bears more than a passing resemblance to a fictional virus written by superhacker Oliver Wendell Jones on a Banana computer in the "Outland" comic strip. "Outland" is produced by Berkeley Breathed, the same sarcastic wit who drew "Bloom County." Last we heard, the TV station was considering legal action against the consultant.

Whatever you do, don't use the name of your poodle.... What's the most prevalent method of system entry by determined data snoops? Late-night break-ins? Putting a gun to your head? Wrong. Most IS security people report that it's the relatively simple procedure of cracking passwords.

Now there's Password Coach, a software pack-  
Daly, page 40



Jesse Berst

# TrueType tributes

First of a two-part series on TrueType.



At first glance, font technology might not seem central to the concerns of IS managers. However, Microsoft's TrueType was one of the most important benefits of last spring's Windows 3.1 update. TrueType helps with three common problems: 1) Overcoming printer differences and limitations. 2) Enforcing corporate standards and consistency. 3) Enabling document exchange across networks.

In this first of two installments, I'd like to spell out why TrueType is important and fill you in on two developments that will make it even more valuable. In the second installment, I'll cover "embedded fonts," a little-known TrueType feature that has great potential.

The TrueType "engine" is built right into Windows. Users don't have to buy anything extra to use it with any Windows application. TrueType not only delivers high-quality type to the printer, but it also creates a matching screen display. What you see on the screen is as close as possible to what you get from the printer.

And when I say "from the printer," I mean any printer, whether it's a Hewlett-Packard LaserJet, a PostScript printer or even a dot-matrix model. As long as it works with Windows, it can reproduce TrueType fonts.

As you probably know, TrueType is a "scalable" technology. Once you have a font outline on your computer, you can scale it up or down to any size. You are not limited to particular point sizes.

TrueType disguises the differences among printers. For instance, a company's Dallas branch can use the same fonts on its HP LaserJet as the Cleveland home office does with its Apple LaserWriter.

Two new products make TrueType even more valuable for corporate users. The original Microsoft Font Pack has become the best-selling type offering in history. Now Microsoft is out with a second Font Pack and a special Microsoft Hewlett-Packard Font Set.

The \$69.95 Font Pack 2 adds new typefaces, including decorative and headline faces. The \$69.95 Microsoft Hewlett-Packard Font Set lets owners of Series II and Series III LaserJets have the same fonts that are built into the new HP Series IV.

Although these products are collections of fonts, the real story is not the type. The real value comes from two new technologies bundled along with Font Pack 2.

One is Font Assistant, which is a way to

manage fonts. As users get more and more TrueType fonts on their systems, the situation soon gets out of hand. For instance, applications such as CorelDraw ship with hundreds of free TrueType fonts.

But having that many fonts creates problems. For instance, users may find they can't properly use the font dialog box in some applications. There isn't enough room on screen to display all the names.

Font Assistant lets users organize fonts into smaller, more manageable collections.

For instance, a user might have one group for business documents and another for newsletters. Font Assistant lets you see all your fonts at any time, print a font catalog and print type specimen pages at the click of a button.

Graphic artists and type specialists will be interested to know that Font Assistant also includes the Panose font identification technology, which classifies type numerically according to a dozen or so key characteristics. The resulting number can be

"attached" to TrueType fonts.

Microsoft has classified all its fonts, so you can use Font Assistant to select a similar font if the original is not available. The system is able to rank fonts by their degree of similarity, giving you a simple way to select the best available match.

Berst is the publisher of Redmond, Wash.-based "Windows Watcher" newsletter, a monthly briefing service for software executives and corporate technology managers.

**C&C** Computers and Communications

# NEC presents the first built-in

We know what you need to survive. You need a network server that's compatible, reliable and able

to grow with your needs. You need a system that can keep up with LAN and multi-user demands.

One that's equipped with the latest Intel® technology, Novell® and Banyan-approved, and one that meets today's EISA standards.

In other words, you need a PowerMate® Express™ server from NEC.



### We adapt to your environment.

We give you total subsystem modularity and scalability, including CPU, memory, video and disk subsystems to support future performance needs. Plus 10 EISA



## Wireless notebooks next in line

CONTINUED FROM PAGE 37

sign and put it across their whole product line, which they needed to do," said Andrew M. Seybold, editor in chief of "The Outlook on Professional Computing" in Brookdale, Calif.

Meanwhile, users appear to be considering color more seriously now, as shown

by how demand has outstripped supply for active-matrix color products such as IBM's ThinkPad 700C.

"We would like to use color now, particularly for people who have to make presentations and work with [Microsoft Corp.'s] PowerPoint," said William Lodge, a project

leader at The Turner Corp. in New York.

W. B. Soper, manager of information systems at Chevron Canada Ltd., said 486-based notebooks should last at least three years, which lets his company cost-justify color. Active-matrix color notebooks in particular remain expensive, although street prices are dropping significantly on these, falling from more than \$5,000 to \$3,500.

Several color notebooks appeared with Intel Corp.'s new 486SL chip inside them.

## Viable option

Users appear to be considering color more seriously now, as shown by how demand has outstripped supply for active-matrix color products such as IBM's ThinkPad 700C.

"We would like to use color now, particularly for people who have to make presentations and work with [Microsoft Corp.'s] PowerPoint," said William Lodge, a project leader at The Turner Corp. in New York.

The 486SL essentially takes the integrated logic components in the 386SL and sticks them around a 486DX core. This will help create more power-efficient notebook designs, but users who buy from vendors that have heavy investments in software-based power management features, such as Toshiba, will see little boost in battery life from the SL.

The initial versions of this 3.3V low-power chip run at 20 MHz and 25 MHz, and a 33-MHz version is slated to appear in the first quarter of 1993.

While Compaq and AST both released color screens on their new 486SL-based notebooks [CW, Nov. 9], both look ahead to a more communications-intensive environment.

Compaq, meanwhile, cut prices on a number of its LTE Lite/25 models to make room for a new model with an active-matrix color screen. Analysts and users said the screen could make this 386SL-based model a hot seller.

"That's a dynamite addition to Compaq's line," commented William F. Ablondi Jr., an analyst at BIS Strategic Decisions in Norwell, Mass.

"I was extremely impressed by this screen," said Edward Fernstrom, MIS director at DynCorp., a near-billion-dollar technical services firm in Reston, Va. Fernstrom cited the improved brightness of the screen over ordinary passive-matrix monochrome screens.

Other vendors announcing color notebooks included Ergo Computing, Inc. and Keydata International, Inc.

Peabody, Mass.-based Ergo released the Nifty Fifty 486 Notebrick, a 6.7-pound color notebook based on a 25/50-MHz Intel 486DX2. One of the most powerful notebooks on the market, it has an 8½-in. passive-matrix color screen and a battery life of two hours. Ergo also released a monochrome version of the product and a monochrome 486SX-based notebook.

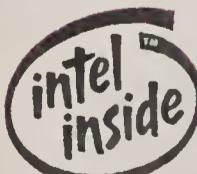
Keydata, in South Plainfield, N.J., announced Keynote, a \$2,795 notebook featuring a 10-in. passive-matrix screen. It is based on Cyrix Corp.'s 33-MHz 486SLC.

## A well-balanced system is a weapon.

Compatibility. Adaptability. And, reliability. Compare our PowerMate Express servers with the competition's and you'll find these features don't come with every computer system.

You'll also find that there's only one company worth trusting your sur-

Next time you need a mission-critical PC or network server, here's something you might want to think about: NEC is one of a small handful of companies that have received the Deming Award, the highest honor bestowed in the quality assurance field, on five separate occasions.



NEC

Because ↑ is the way you want to go.



## NEED GLOBAL SALES LEADS?

Advertise in Computerworld's new Global Response Cards.

Next ad close: January 25

800-343-6474  
x757

## Daly

CONTINUED FROM PAGE 37

age that puts your password choice through 45 strength tests before giving it a stamp of approval.

Password Coach starts at \$395 per Novell NetWare server (for an unlimited number of users) and is available from Baseline Software in Sausalito, Calif.

**And counting....** According to the Defense Advanced Research Projects Agency's Computer Emergency Response Team, the number of security incidents on the Internet have increased from one per day in 1991 to three a day this year.

**Pretty as a picture....** Woodside Technologies in Sunnyvale, Calif., has announced what it claims is the first GUI-based security program with antivirus protection for

Unix. The \$495 Fortress includes a Trojan Horse detector, a password strength test, a file virus inoculator and a feature that looks for weak points in your system. Fortress is now available on Sun hardware sporting the OpenLook interface and will be available in the Motif GUI for IBM and HP workstations next year.

**System meltdown countdown....** Users

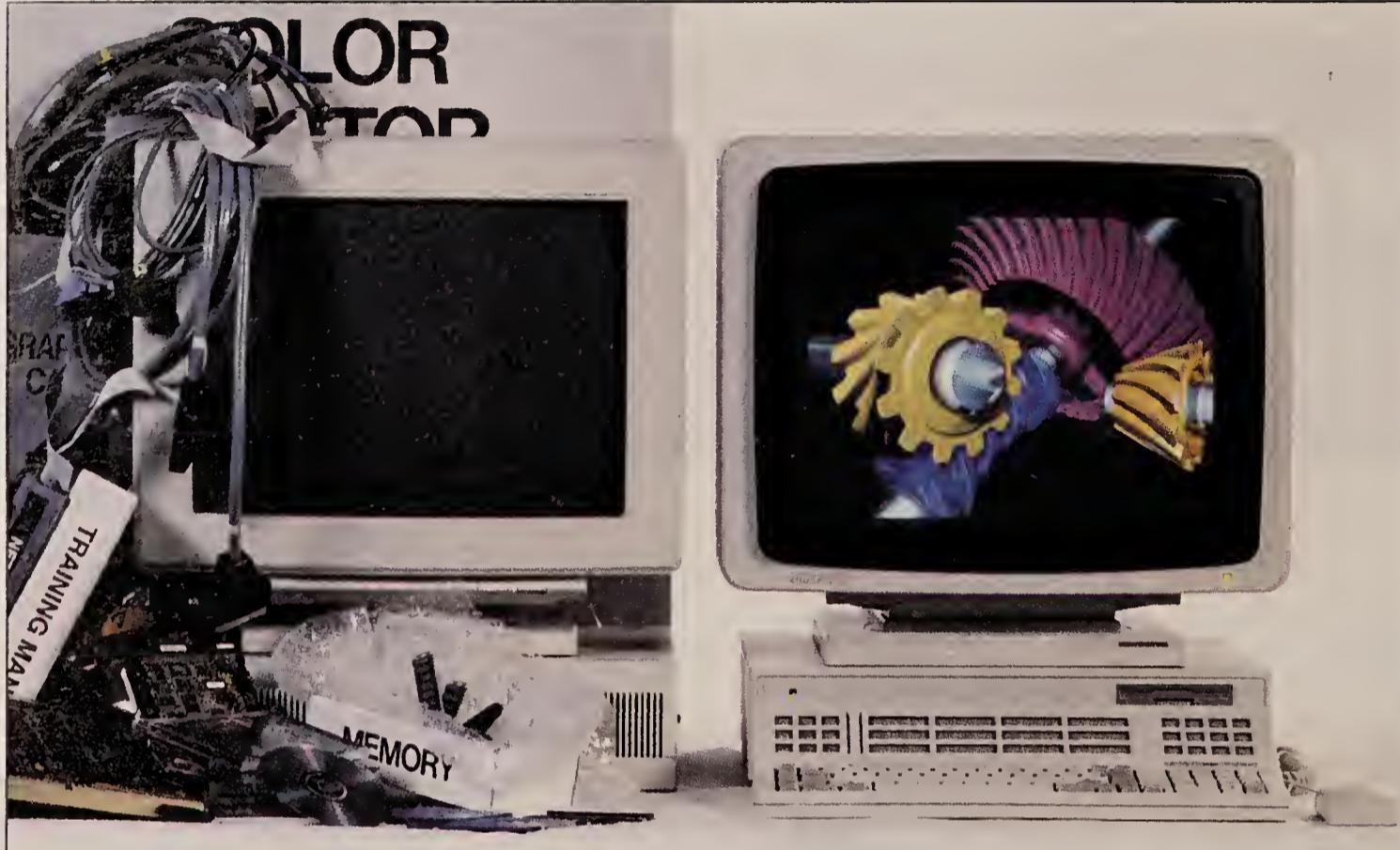
of distributed systems may want to get their hands on a new book called *Distributed Systems Security Perspectives* from Demax Software in San Mateo, Calif. The \$29.95 book is a collection of interviews with prominent members of the IS security community. Among the conclusions: A security breakdown far greater than the Internet worm could not only happen but is likely to happen.

Peter Neumann, principal scientist at SRI International, says: "We haven't yet had the colossal break-in where somebody gets into a life-critical system and kills people, or billions of dollars disappear as a result of fraud. You will see the Bhopals and Chernobyls of computer security." Call 1 (800) 283-3629 for a copy.

**Bring your own lampshade....** For the past few years, the computer underground has sponsored a late-year conference called HoHoCon. This year, it will be open to all interested parties including "federal agents, lawyers and authors." If you'd like to check in for three days of meetings, speeches and good times, the meeting is scheduled for Dec. 18 to 20 at Houston's Allen Park Inn. For conference details, the "Security Insider Report" suggests you contact your friendly neighborhood hacker or dial into the Demon Roach Underground at (806) 794-4362. Login: THRASH NUP: Jihad.

**Speaking of cyberpunks....** On Nov. 24, Tucson, Ariz.-based security consultant Ray Kaplan will host an interactive 90-minute telephone conference with some of the most legendary names in the computer underground, including Kevin Mitnick, Lenny DiCicco and Roscoe, all of whom were featured in the 1991 book *Cyberpunk*. Here's your chance to squeeze these fellas about the technical details of their attacks and what can be done to prevent similar assaults. Call Kaplan at (602) 323-4606 for more details.

Daly is a *Computerworld* West Coast senior correspondent.



## NOT CONFIGURED

## CONFIGURED

THE COST OF  
CONFIGURING  
MAY BE MORE  
THAN YOU'RE  
FIGURING.

Intergraph workstations are configured to handle real-world applications straight out of the box.

If you're not buying Intergraph, then you're buying pieces of workstations: a color monitor, a disk, a mouse, and more memory. Then figure in the cost of application integration, worldwide customer service, and open systems solutions.

Bottom line, it takes more than just a box to get your job done. It takes solutions from Intergraph.

Call us today at 800-826-3515 or 205-730-2727 for more information on our SOLUTIONStation products and our superior portfolio of more than 1,200 integrated applications.

**INTERGRAPH**  
Everywhere you look.

INTERGRAPH, SOLUTIONStation, and the INTERGRAPH logo are trademarks of Intergraph Corporation. Copyright © 1992 Intergraph Corporation, Huntsville, AL 35894-0001. DEAL#71A0.

In

Brief

### NetWare-ready PC pact

CompuAdd Corp. signed a reseller agreement with Novell, Inc., paving the way for all desktop and floor-standing PCs from CompuAdd—including a six-model line of PCs and servers announced last week—to be shipped NetWare-ready.

### Disk drive from Adstar

IBM's Adstar unit released several new disk drives, including a 4G-byte 5 1/4-in. drive, a 2G-byte 3 1/2-in. drive and the first 3 1/2-in. drive to use Enhanced Intelligent Peripheral interface, a disk control device, the company said.

1-800  
RACAL  
55

1-800  
RACAL  
55

## **"I WANT A NEW PERSPECTIVE ON NETWORKING."**

- Please send me information on Racal-Datacom's networking capabilities.
- Please have a sales person call me.

Name \_\_\_\_\_

Title \_\_\_\_\_

Organization \_\_\_\_\_

My Company Is:  End User  VAR/DLR  Distributor  OEM/SI

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone ( \_\_\_\_ ) \_\_\_\_\_

OR CALL 1-800-RACAL-55

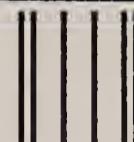
**Racal-Datacom™**

WE UNDERSTAND NETWORKING INSIDE AND OUT.™ **RACAL**

© 1992 Racal-Datacom, Inc. All rights reserved.

2202

1-800  
RACAL  
55



No Postage  
Necessary If  
Mailed In The  
United States

**BUSINESS REPLY MAIL**

FIRST CLASS MAIL PERMIT NO. 140 BOXBOROUGH, MA

Postage Will Be Paid By Addressee

**Racal-Datacom**

ATTN: Pre-Sales Support  
155 Swanson Road  
Boxborough, MA 01719-9980



1-800  
RACAL  
55

T1 AND E1  
SYSTEMS



NETWORK  
MANAGEMENT



DIGITAL  
ACCESS



1-800  
RACAL  
55

To Manage  
Network Traffic,

In Any Computing  
Environment,

While Keeping The  
Business In High Gear,

Takes A Networking  
Partner With A  
Heightened Perspective.

**Racal-Datacom.**

Information flow is critical to a company's success. And your network management system can mean the difference between stalling your company's business strategy and keeping it headed in the right direction.

At Racal-Datacom, we offer the tools, solutions and partnership to support both your company's networking strategy and its business strategy. Whether you're managing a stand-alone application or an integrated LAN and WAN network.

Our network management approach, the Racal Management System, offers

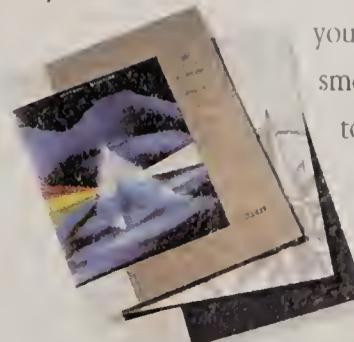
comprehensive solutions. It was designed to support your network as you migrate from a hierarchical computing strategy to a client-server model.

The system is based on today's network management standards, like SNMP, and provides interfaces to other systems such as IBM NetView™. And in the future, we'll add new standards and capabilities as they emerge.

As your company business strategy evolves and your network needs grow, your investment will be preserved. At Racal-Datacom, we stand behind these promises, for thousands of

global networking customers in more than 80 countries.

To learn more about the support we can offer, call 1-800-RACAL-55 for our free paper, "Business Issues in Network Management." See for yourself how Racal-Datacom can keep



your business running smoothly today and tomorrow.

**Racal-Datacom™**

WE UNDERSTAND NETWORKING INSIDE AND OUT.™

**RACAL**

1-800  
RACAL  
55



Call 1-800-444-7999. \*\*Upgrade from Windows and DOS. \$99, \$149 base operating system. These prices valid only when ordered directly from IBM. A 30-day trial period of purchase required. Dealer prices may vary. Valid in USA only. Shipping and handling not included. IBM and OS/2 are registered trademarks and OS/2 Crash Protection is a trademark of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation and Adobe Type Manager is a registered trademark of Adobe Systems Incorporated. ©1992 IBM Corp.

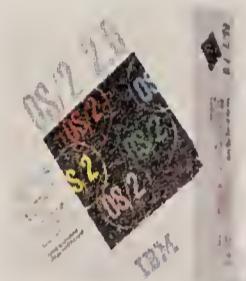


## With OS/2 2.0, you won't need one of these.

If you run more than one application at a time with DOS and Windows™, brace yourself. When one application fails, the entire system can fail. It's called a crash, but most people call it worse than that. Because each time it happens, you have to reboot your computer. If you didn't save what you were working on, you simply have to do it again. So every crash could be a huge crush. And a huge waste of time.

OS/2® 2.0 is different, because OS/2 Crash Protection™ helps shield applications from each other. In other words, each running application is self-contained, so if one goes down it won't affect the others or the operating system. No frequent systemwide crashes like in Windows. So you won't lose all your valuable work. Not to mention time. And OS/2 can also save you money, because for less than the cost of DOS and Windows, you get the capabilities of both. Plus all the added benefits of OS/2 2.0—including Adobe Type Manager.®

OS/2 2.0 lets you work like you never could before. And OS/2 Crash Protection helps keep it all from coming to a crashing halt. For an IBM authorized dealer near you, or to order OS/2 2.0 from IBM—for only \$99 for Windows and DOS users—call 1 800 3-IBM-OS2.\*



## Presenting OS/2 Crash Protection.

- 
- Runs DOS, Windows and OS/2 applications from a single system.
  - OS/2 Crash Protection helps shield applications from each other.
  - No need to reboot your computer if an application fails.
  - Supported on most IBM-compatible 386 SX PCs and above.
  - OS/2 2.0 upgrade: \$99 from Windows and DOS.\*\*



# Cheap cure for power problems posed

By Mel Mandell

The addition of a few dollars worth of capacitors to the power supplies of PCs may prevent many crashes, according to recent research by an engineer at New England Power Service.

Edward M. Gulachenski, manager of re-

lay and control engineering at the Westboro, Mass., subsidiary of New England Electric Company (NEEC), based his recommendation on a study of power delivered to 50,000 NEEC customers.

What he found was that most of the power disturbances lasted less than a second, and adding the extra capacitors to PC pow-

er supplies would help override those momentary interruptions. The added capacitance would eliminate the need for many, although not all, users to buy uninterruptible power supplies (UPS).

Now, Gulachenski is lobbying computer makers and the companies that make their power supplies to add the capacitors, and

he has received interest from at least one vendor, Digital Equipment Corp. A DEC engineer was one of thousands of New England Power customers to whom Gulachenski sent a report of his findings.

Gulachenski had Model 626 Universal Disturbance Analyzers from Dranetz Technologies, Inc. in Edison, N.J., attached to the feeders fanning out from six NEEC substations spread from the border of New Hampshire down into Rhode Island. He then did a PC-based analysis of the disturbance data before drawing his conclusions.

Each monitor was equipped with a Hayes Microsystems, Inc. modem connected to a Compaq Computer Corp. 386 PC in Gulachenski's office. The data, collected automatically, is maintained on a Borland International, Inc. Paradox database.

## Problem monitor

Once a month, Gulachenski prints a report on a Hewlett-Packard Co. LaserJet III that details all disturbances detected during the prior month. During the study period, customers whose power was monitored were queried as to the impact and extent of problems.



John Elsbree, engineering manager at DEC's PC group in Acton, Mass., has met with Gulachenski and circulated the recommendation to his staff for comment and is planning to test it.

But even if a test finds a cost-effective gain in overriding common short interruptions, the best way for it to be implemented is for the vendors of PC power supplies to add the extra capacitance "... so that all PC makers benefit from economies of scale," Elsbree said.

Gulachenski's recommendation to add energy-storing capacitance to the power supplies of PCs has met with skepticism from the manufacturers of UPSs.

Douglas S. Dorr, an evaluation engineer at National Power Laboratories, a division of Best Power Technology, Inc. in Necedah, Wis., noted that the added capacitance protects only against the minority of interruptions that last one second or less.

In addition, there are other kinds of power-line disturbances, such as surges, that cannot be countered by adding capacitance, Dorr said. He also claimed that the added capacitance increases distortion on the power line.

In rebuttal, Gulachenski cited research showing that even adding twice the capacitance that he suggests would bring little distortion.

Conceding that his recommendation only counters momentary interruptions, Gulachenski rated it a highly cost-effective measure compared with spending \$150 to \$600 for an UPS for each PC. Even in Gulachenski's office some PCs are protected by UPSs.

Gulachenski said the substation study was the first ever undertaken by a power company. However, he expects others to follow based on his presentations of results at two recent conferences on power quality.

Mandell is a technical writer based in New York.

## ENTER A NEW MARKET

Since the establishment of the CIS in January 1992, the market for computers has changed dramatically.

have left the market in the former Soviet Union wide open.

THE CIS MARKET:  
DON'T WAIT - NOW IS THE TIME!

The potential of entering the CIS market now was stated by Robert Strauss, U.S. Ambassador to Russia, when he visited COMTEK '92: "No one would have dreamed three years ago that this exhibition would be in this kind of shape. I find it very exciting and I am anxious to go back and report it to my colleagues in the United States...it's wonderful."

"This is the main show...If you're going to do a show it's got to be this one."

- Lotus

To join the most successful companies in the CIS market, call or fax for more information today!

COMTEK '93  
The International Computer Technology Exposition & Conference  
26-30 April, 1993  
Moscow, Russia

"It reminds me of the industry in Silicon Valley about 20 years ago...CIS firms are getting larger and more professional."

- Esther Dyson

### COMTEK '93: WE MAKE IT EASY.

Comtek International will provide a complete package for you including everything you need for a successful visit to the CIS. From complete exhibit displays, to hotels, meals and interpreters, we do all the work. All you have to do is send your staff and your products.

### COMTEK '93: IF YOU MISS THIS SHOW YOU MISS THE MARKET.

Over 90% of COMTEK '92 exhibitors have already reserved space for COMTEK '93.

**COMTEK**  
INTERNATIONAL

43 Danbury Road  
Wilton, Connecticut, USA 06897  
Tel: 203-834-1122 • Fax: 203-762-0773

MIDNIGHT	1:30 AM	3:00 AM	4:29 AM	5:59 AM	7:28 AM	8:58 AM	10:28 AM	11:58 AM	1:28 PM	2:58 PM	4:27 PM	5:57 PM	7:26 PM	8:56 PM	10:26 PM
12:01 AM	1:31 AM	3:01 AM	4:30 AM	6:00 AM	7:29 AM	8:59 AM	10:29 AM	11:59 AM	1:29 PM	2:59 PM	4:28 PM	5:58 PM	7:27 PM	8:57 PM	10:27 PM
12:02 AM	1:32 AM	3:02 AM	4:31 AM	6:01 AM	7:30 AM	9:00 AM	10:30 AM	NOON	1:30 PM	3:00 PM	4:29 PM	5:59 PM	7:28 PM	8:58 PM	10:28 PM
12:03 AM	1:33 AM	3:03 AM	4:32 AM	6:02 AM	7:31 AM	9:01 AM	10:31 AM	12:01 PM	1:31 PM	3:01 PM	4:30 PM	6:00 PM	7:29 PM	8:59 PM	10:29 PM
12:04 AM	1:34 AM	3:04 AM	4:33 AM	6:03 AM	7:32 AM	9:02 AM	10:32 AM	12:02 PM	1:32 PM	3:02 PM	4:31 PM	6:01 PM	7:30 PM	9:00 PM	10:30 PM
12:05 AM	1:35 AM	3:05 AM	4:34 AM	6:04 AM	7:33 AM	9:03 AM	10:33 AM	12:03 PM	1:33 PM	3:03 PM	4:32 PM	6:02 PM	7:31 PM	9:01 PM	10:31 PM
12:06 AM	1:36 AM	3:06 AM	4:35 AM	6:05 AM	7:34 AM	9:04 AM	10:34 AM	12:04 PM	1:34 PM	3:04 PM	4:33 PM	6:03 PM	7:32 PM	9:02 PM	10:32 PM
12:07 AM	1:37 AM	3:07 AM	4:36 AM	6:06 AM	7:35 AM	9:05 AM	10:35 AM	12:05 PM	1:35 PM	3:05 PM	4:34 PM	6:04 PM	7:33 PM	9:03 PM	10:33 PM
12:08 AM	1:38 AM	3:08 AM	4:37 AM	6:07 AM	7:36 AM	9:06 AM	10:36 AM	12:06 PM	1:36 PM	3:06 PM	4:35 PM	6:05 PM	7:34 PM	9:04 PM	10:34 PM
12:09 AM	1:39 AM	3:09 AM	4:38 AM	6:08 AM	7:37 AM	9:07 AM	10:37 AM	12:07 PM	1:37 PM	3:07 PM	4:36 PM	6:06 PM	7:35 PM	9:05 PM	10:35 PM
12:10 AM	1:40 AM	3:10 AM	4:39 AM	6:09 AM	7:38 AM	9:08 AM	10:38 AM	12:08 PM	1:38 PM	3:08 PM	4:37 PM	6:07 PM	7:36 PM	9:06 PM	10:36 PM
12:11 AM	1:41 AM	3:11 AM	4:40 AM	6:10 AM	7:39 AM	9:09 AM	10:39 AM	12:09 PM	1:39 PM	3:09 PM	4:38 PM	6:08 PM	7:37 PM	9:07 PM	10:37 PM
12:12 AM	1:42 AM	3:12 AM	4:41 AM	6:11 AM	7:40 AM	9:10 AM	10:40 AM	12:10 PM	1:40 PM	3:10 PM	4:39 PM	6:09 PM	7:38 PM	9:08 PM	10:38 PM
12:13 AM	1:43 AM	3:13 AM	4:42 AM	6:12 AM	7:41 AM	9:11 AM	10:41 AM	12:11 PM	1:41 PM	3:11 PM	4:40 PM	6:10 PM	7:39 PM	9:09 PM	10:39 PM
12:14 AM	1:44 AM	3:14 AM	4:43 AM	6:13 AM	7:42 AM	9:12 AM	10:42 AM	12:12 PM	1:42 PM	3:12 PM	4:41 PM	6:10 PM	7:40 PM	9:10 PM	10:40 PM
12:15 AM	1:45 AM	3:15 AM	4:44 AM	6:14 AM	7:43 AM	9:13 AM	10:43 AM	12:13 PM	1:43 PM	3:12 PM	4:42 PM	6:11 PM	7:41 PM	9:11 PM	10:41 PM
12:16 AM	1:46 AM	3:16 AM	4:45 AM	6:15 AM	7:44 AM	9:14 AM	10:44 AM	12:14 PM	1:44 PM	3:13 PM	4:43 PM	6:12 PM	7:42 PM	9:12 PM	10:42 PM
12:17 AM	1:47 AM	3:17 AM	4:46 AM	6:16 AM	7:45 AM	9:15 AM	10:45 AM	12:15 PM	1:45 PM	3:14 PM	4:44 PM	6:13 PM	7:43 PM	9:13 PM	10:43 PM
12:18 AM	1:48 AM	3:18 AM	4:47 AM	6:17 AM	7:46 AM	9:16 AM	10:46 AM	12:16 PM	1:46 PM	3:15 PM	4:45 PM	6:14 PM	7:44 PM	9:14 PM	10:44 PM
12:19 AM	1:49 AM	3:19 AM	4:48 AM	6:18 AM	7:47 AM	9:17 AM	10:47 AM	12:17 PM	1:47 PM	3:16 PM	4:46 PM	6:15 PM	7:45 PM	9:15 PM	10:45 PM
12:20 AM	1:50 AM	3:20 AM	4:49 AM	6:19 AM	7:48 AM	9:18 AM	10:48 AM	12:18 PM	1:48 PM	3:17 PM	4:47 PM	6:16 PM	7:46 PM	9:16 PM	10:46 PM
12:21 AM	1:51 AM	3:20 AM	4:50 AM	6:19 AM	7:49 AM	9:19 AM	10:49 AM	12:19 PM	1:49 PM	3:18 PM	4:48 PM	6:17 PM	7:47 PM	9:17 PM	10:48 PM

# Announcing the disk storage system you need for times like these.

12:22 AM	1:52 AM	3:21 AM	4:51 AM	6:20 AM	7:50 AM	9:20 AM	10:50 AM	12:20 PM	1:50 PM	3:19 PM	4:49 PM	6:18 PM	7:48 PM	9:18 PM	10:49 PM
12:23 AM	1:53 AM	3:22 AM	4:52 AM	6:21 AM	7:51 AM	9:21 AM	10:51 AM	12:21 PM	1:51 PM	3:20 PM	4:50 PM	6:19 PM	7:49 PM	9:19 PM	10:50 PM
12:24 AM	1:54 AM	3:23 AM	4:53 AM	6:22 AM	7:52 AM	9:22 AM	10:52 AM	12:22 PM	1:52 PM	3:21 PM	4:51 PM	6:20 PM	7:50 PM	9:20 PM	10:51 PM
12:25 AM	1:55 AM	3:24 AM	4:54 AM	6:23 AM	7:53 AM	9:23 AM	10:53 AM	12:23 PM	1:53 PM	3:22 PM	4:52 PM	6:21 PM	7:51 PM	9:21 PM	10:52 PM
12:26 AM	1:56 AM	3:25 AM	4:55 AM	6:24 AM	7:54 AM	9:24 AM	10:54 AM	12:24 PM	1:54 PM	3:23 PM	4:53 PM	6:22 PM	7:52 PM	9:22 PM	10:53 PM
12:27 AM	1:57 AM	3:26 AM	4:56 AM	6:25 AM	7:55 AM	9:25 AM	10:55 AM	12:25 PM	1:55 PM	3:24 PM	4:54 PM	6:23 PM	7:53 PM	9:23 PM	10:54 PM
12:28 AM	1:58 AM	3:27 AM	4:57 AM	6:26 AM	7:56 AM	9:26 AM	10:56 AM	12:26 PM	1:56 PM	3:25 PM	4:55 PM	6:24 PM	7:54 PM	9:24 PM	10:55 PM
12:29 AM	1:59 AM	3:28 AM	4:58 AM	6:27 AM	7:57 AM	9:27 AM	10:57 AM	12:27 PM	1:57 PM	3:26 PM	4:56 PM	6:25 PM	7:55 PM	9:25 PM	10:56 PM
12:30 AM	2:00 AM	3:29 AM	4:59 AM	6:28 AM	7:58 AM	9:28 AM	10:58 AM	12:28 PM	1:58 PM	3:27 PM	4:57 PM	6:26 PM	7:56 PM	9:26 PM	10:57 PM
12:31 AM	2:01 AM	3:30 AM	5:00 AM	6:29 AM	7:59 AM	9:29 AM	10:59 AM	12:29 PM	1:59 PM	3:28 PM	4:58 PM	6:27 PM	7:57 PM	9:27 PM	10:58 PM
12:32 AM	2:02 AM	3:31 AM	5:01 AM	6:30 AM	8:00 AM	9:30 AM	11:00 AM	12:30 PM	2:00 PM	3:29 PM	4:59 PM	6:28 PM	7:58 PM	9:28 PM	10:59 PM
12:33 AM	2:03 AM	3:32 AM	5:02 AM	6:31 AM	8:01 AM	9:31 AM	11:01 AM	12:31 PM	2:01 PM	3:30 PM	5:00 PM	6:29 PM	7:59 PM	9:29 PM	11:00 PM
12:34 AM	2:04 AM	3:33 AM	5:03 AM	6:32 AM	8:02 AM	9:32 AM	11:02 AM	12:32 PM	2:02 PM	3:31 PM	5:01 PM	6:30 PM	8:00 PM	9:30 PM	11:01 PM
12:35 AM	2:05 AM	3:34 AM	5:04 AM	6:33 AM	8:03 AM	9:33 AM	11:03 AM	12:33 PM	2:03 PM	3:32 PM	5:02 PM	6:31 PM	8:01 PM	9:31 PM	11:02 PM
12:36 AM	2:06 AM	3:35 AM	5:05 AM	6:34 AM	8:04 AM	9:34 AM	11:04 AM	12:34 PM	2:04 PM	3:33 PM	5:03 PM	6:32 PM	8:02 PM	9:32 PM	11:03 PM
12:37 AM	2:07 AM	3:36 AM	5:06 AM	6:35 AM	8:05 AM	9:35 AM	11:05 AM	12:35 PM	2:05 PM	3:34 PM	5:04 PM	6:33 PM	8:03 PM	9:33 PM	11:04 PM
12:38 AM	2:08 AM	3:37 AM	5:07 AM	6:36 AM	8:06 AM	9:36 AM	11:06 AM	12:36 PM	2:06 PM	3:35 PM	5:05 PM	6:34 PM	8:04 PM	9:34 PM	11:06 PM
12:39 AM	2:09 AM	3:38 AM	5:08 AM	6:37 AM	8:07 AM	9:37 AM	11:07 AM	12:37 PM	2:07 PM	3:36 PM	5:06 PM	6:35 PM	8:05 PM	9:35 PM	11:07 PM
12:40 AM	2:10 AM	3:39 AM	5:09 AM	6:38 AM	8:08 AM	9:38 AM	11:08 AM	12:38 PM	2:08 PM	3:37 PM	5:07 PM	6:36 PM	8:06 PM	9:36 PM	11:08 PM
12:41 AM	2:11 AM	3:40 AM	5:10 AM	6:39 AM	8:09 AM	9									

# ClarisWorks now available for the Windows platform

By James Daly  
SANTA CLARA, CALIF.

Apple Computer, Inc. software subsidiary Claris Corp. continued its "if you can't beat

'em, join 'em" strategy last week when it announced its second internally developed product for Microsoft Corp.'s Windows platform.

The rollout of the ClarisWorks for Windows integrated application comes several months after the introduction of Claris' FileMaker Pro for Windows 2.0 database management system.

The about-face by the perennially Macintosh-centric Claris stems from heavy market demand for the Windows 3.0 and

3.1 graphical user interface. Microsoft claims to have shipped a total of more than 12 million copies of both versions.

ClarisWorks has proved to be a huge success on the Macintosh platform since it was introduced last year, stealing the top position in the integrated packages category from archrival Works from Microsoft.

ClarisWorks accounted for a 77% share of that market during the second quarter, according to the Software Publishers Association (SPA). The market for limited

function, integrated Windows applications is also growing at the astounding rate of 100% a year, according to the SPA.

Integrated applications have become popular in recent years as a result of the massive increase in the number of portable computers. Integrated packages are typically geared toward mobile users looking for a fundamental set of standard business tools in an inexpensive package.

They are often considered a good option for users who are repelled by the high cost of full-featured software overloaded with esoteric features that they will probably never touch. Such applications also do not require the vast amount of memory or storage of their full-featured cousins.

ClarisWorks for Windows will include word processing, graphics, spreadsheet, charting and database features. Both the Macintosh and Windows versions of ClarisWorks share the same file format so work created on a PC or Macintosh can run on either platform without modification or translation, Claris officials said.

The new application is slated to ship during the first half of next year. A suggested retail price will be announced at a later date, Claris officials said.

## New Products

### Systems

Blackcurrant Technology has introduced BlackMirror, an automatic, continuous hard disk drive data backup system.

Users install BlackMirror by plugging it into the parallel port of an IBM PC or compatible and uploading the software. Files are copied automatically. Because the backup process is continuous, files are always up to date, the company reported.

Stored data can typically be accessed at the same speed as data on the PC's internal hard disk drive, according to the firm.

BlackMirror is available in 80M-, 120M-, 160M- and 240M-byte capacity units. Prices start at \$799.

►Blackcurrant Technology  
Suite 300  
575 Anton Blvd.  
Costa Mesa, Calif. 92626  
(714) 432-6514

### Fax

Future Soft Engineering, Inc. has announced Terminal Plus with FAXit, a communications and fax software solution for Microsoft Corp. Windows.

According to the firm, the software allows users to send and read faxes from any Windows application. The package offers preconfigured settings for more than 80 modems, plus a range of terminal emulations and file transfer protocols. Other functions include automatic notification of incoming faxes and on-screen revision of outgoing faxes.

Terminal Plus with FAXit costs \$195.  
►Future Soft Engineering  
Suite 101  
1001 South Dairy Ashford  
Houston, Texas 77077  
(713) 496-9400



To run your office smoothly, you need the perfect match: one package that does it all. Perfectly. And a software reseller like Software Spectrum.

Announcing WordPerfect Office 3.1, a more powerful, easier-to-use electronic mail program. With this award-winning product, your Email, scheduling, and time-management needs can be met simply, efficiently, and inexpensively. That's because Office 3.1 now includes Folders, Remote Mail, Program Launching, WordPerfect Connections (previously sold separately), and an outbound FAX service, all at no extra charge.

When you buy WordPerfect Office from Software Spectrum, you get a perfect match: an Email product from the best-qualified, friendliest reseller in the business.

To order WordPerfect Office, simply call Software Spectrum from 7 am to 7 pm (Central).

**1-800-824-3323**

**SOFTWARE  
SPECTRUM**

Prices Subject To Change.

Whoever said time is money must have been thinking of disk storage on a mainframe computer, where downtime can cost upwards of \$100,000 a day. But now that's a thing of the past, thanks to the Symmetrix 5500 from EMC.

As the latest product in the Symmetrix

Simply put, Symmetrix is a significant technological advancement over conventional DASD and cached storage. Which helps to explain why it already enjoys widespread acceptance across all IBM and compatible platforms.

The Symmetrix 5500 is a product of EMC's

# Introducing Symmetrix 5500 from EMC.

Series, the 5500 also offers true continuous operation, which provides access to your data when you need it - 24 hours a day, seven days a week. It also offers proactive maintenance features, a full mirroring option, hardware redundancy and hot replacement and upgrade of all critical components.

The Symmetrix 5500 is a further evolution of EMC's Symmetrix Series of Integrated Cached

Disk  
Arrays  
(ICDA™),  
which  
leads the  
industry

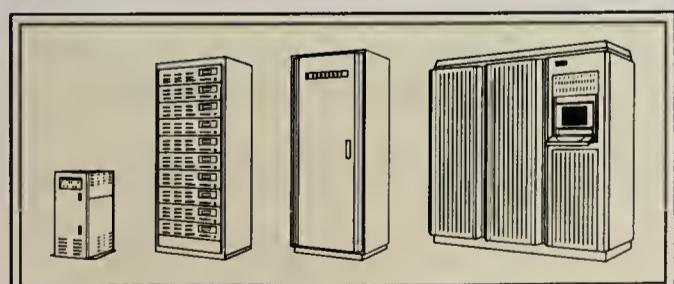
The Symmetrix 5500 is part of an entire line of disk storage systems based on EMC's Integrated Cached Disk Arrays (ICDA™). in virtually every significant disk category: performance, capacity per square foot, environmental, cost of ownership and data availability.



MOSAIC:2000™ architecture for storage development, which allows us to bring the best of today's technology to market quicker. This allows our customers to take advantage of the strategic benefits of technology leadership with the Symmetrix Series.

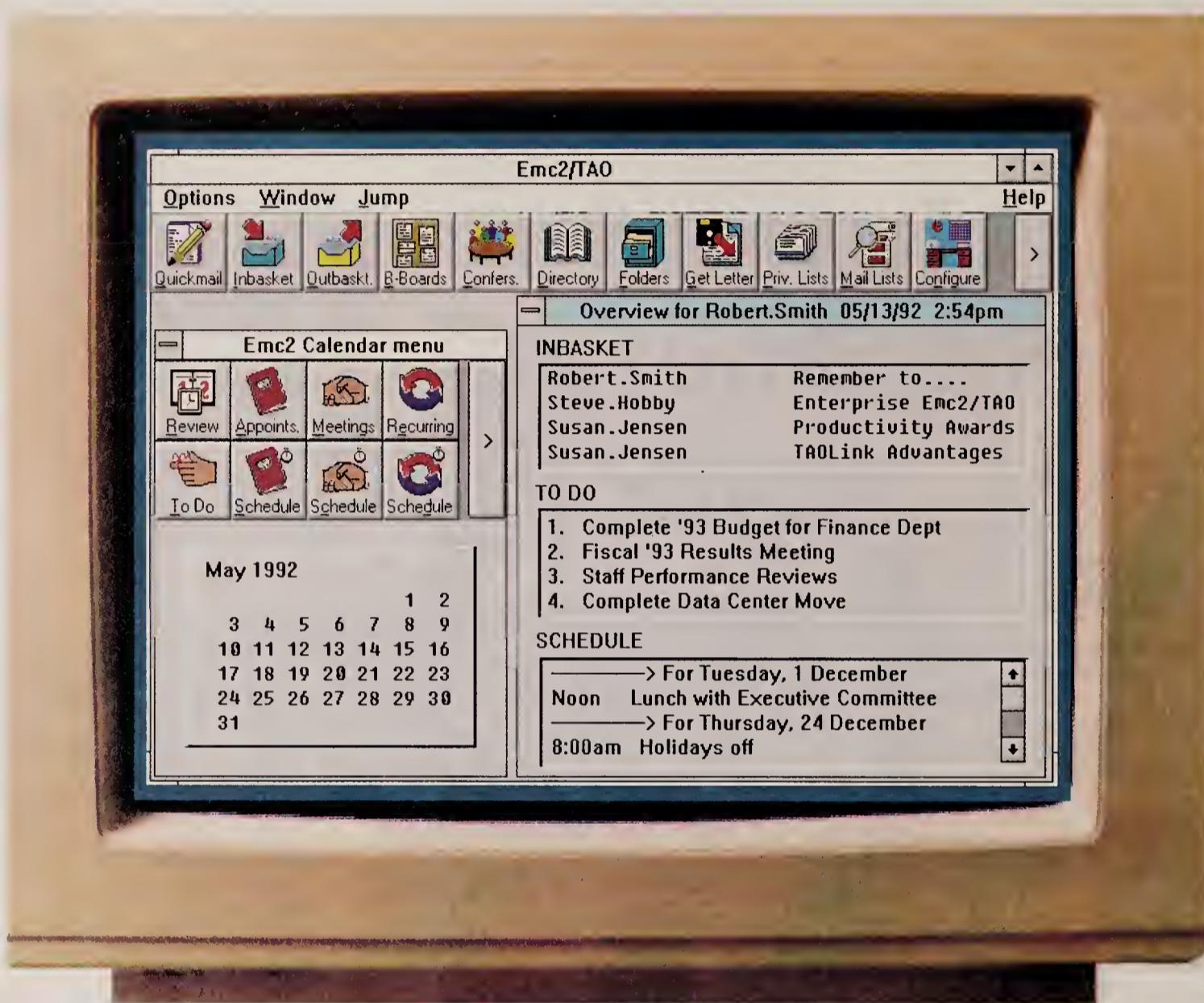
In today's competitive business environment, it is vital to have access to critical data when you need it. Now Symmetrix 5500 brings around the clock availability and fast access to data that is mandatory for times like these.

For further information on the Symmetrix Series, please call 1-800-424-EMC2, extension LM63C.



**EMC<sup>2</sup>**  
THE STORAGE ARCHITECTS

# E-Mail For Both Mainframe And LAN Is A Huge Headache...



# Not!

*Emc<sup>2</sup>/TAO*<sup>®</sup>

runs on Mainframe, AS/400, and LAN alike —  
one directory, one database, one calendar,  
one E-mail and office automation system, one solution.

End of headache.

# Free!

Call for your copy of an  
independent consulting firm's report  
"Emc<sup>2</sup>/TAO design and architecture  
lead the way to LAN implementations."

**1-800-237-4510**



**FISCHER**  
INTERNATIONAL  
SYSTEMS CORPORATION  
4073 Mercantile Ave.  
Naples, FL 33942  
(813) 643-1500

Emc<sup>2</sup>/TAO  
RESEARCH  
REPORT

## Sun clears up Solaris act

By Maryfran Johnson

With its gaze fixed on the commercial market and the "rightsizing" phenomenon, SunSoft, Inc. recently launched an updated, bug-bombed version of the Solaris operating system.

"Quality improvement" was the rallying cry for Solaris 2.1, which SunSoft cleansed of some 1,300 bugs from 4 million lines of code. The 32-bit software environment, scheduled to ship next month on all new systems, offers a 40% increase in network performance and a slew of installation, administration and security improvements.

"The two biggest problems in downsizing are security and system management," said Tom Wood, a senior industry analyst at Business Research Group, Inc. in Newton, Mass. "It appears quite clearly that Sun has addressed those problems strongly with this new release of Solaris."

### Critical components

This version, priced at \$795 for single desktops, also provides fully symmetric multiprocessing and multithreading capabilities — critical components for SunSoft's multiprocessor servers. Major enhancements for users with two- and three-dimensional graphics needs were also added.

"It's probably a pretty decent operating system, but Sun isn't capturing a lot of mind share yet," said Judith Hurwitz, president of Hurwitz Consulting Group in Newton, Mass. "One thing they have done is make Solaris more modular, and that's important to users."

Another important aspect for users is the ability to run their current applications under Solaris 2.0 and 2.1. Yet, of the 5,000 Scalable Processor Architecture (SPARC) applications available to

**SunSoft cleansed Solaris 2.1 of some 1,300 bugs from 4 million lines of code**

day, only 800 of them so far have third-party vendors committed to native ports for Solaris 2.0 and beyond.

One way SunSoft said it hopes to avoid this problem is by enabling users to run SPARC applications under 2.0 through the Binary Compatibility Mode feature, a kind of emulator that includes the Solaris 1.1 libraries.

The catch is that applications have to be dynamically linked to use the compatibility mode. SunSoft officials said about 40% of currently available applications were built with dynamic linking capabilities.

### Important features

Among the key features of Solaris 2.1 are the following:

- **JumpStart:** A feature that automatically installs and configures hundreds of SunSoft systems across a network, simultaneously and with no user interaction.
- **Online Backup:** A product for restoring and backing up Solaris 2.0 data across the network.
- **User Manager:** A graphical tool enabling users on worldwide networks to add new accounts and build user directories on remote servers.
- **Solaris Shield:** A product providing C2-level security, which is a critical requirement in some government contracts.
- **XGL Graphics Library:** A software programming interface, hardware device driver interface and runtime environment for developing 2-D and 3-D geometry-based graphics applications in the technical market.
- **Information On-Line:** A bundled version of the AnswerBook hypertext-based on-line documentation facility with information from user manuals.
- **Software Manager:** An icon-based feature for installing and manipulating third-party applications, whether they are on CD-ROM or hard disk.

## Windows for Workgroups tough LAN competitor

By Michele Dostert

Windows for Workgroups, the combined desktop/networking product from Microsoft Corp., is expected to have a major impact on the peer-to-peer local-area network operating system market.

Because Windows for Workgroups includes, at no extra charge, the same type of networking services sold by companies such as Artisoft, Inc., based in Tucson, Ariz., Sitka, Inc., based in Alameda, Calif., and Tiara Computer Systems, Inc., based in Mountain View, Calif., these companies may have suddenly become superfluous in the networking world.

"Windows for Workgroups eliminates the need for customers to buy additional networking software to connect their PCs," said Russell Siegelman, product manager for Windows for Workgroups. "We have built the peer-to-peer networking, which people used to buy from companies like Artisoft, directly into Windows for Workgroups as a set of services."

### What's missing?

In its first release, Windows for Workgroups does not have many of the features found in other peer-to-

### Networking with Windows for Workgroups

#### STRENGTHS:

- FREE WHEN YOU BUY THE DESKTOP OPERATING SYSTEM.
- SIMPLE, EASY TO USE AND MAINTAIN.
- TIGHTLY INTEGRATED WITH MICROSOFT'S MAIL-ENABLED APPLICATIONS, MESSAGING AND SCHEDULING.

#### WEAKNESSES:

- WON'T WORK WITH MACINTOSH OR OS/2 CLIENTS.
- WON'T SUPPORT OTHER PEER-TO-PEER LAN CLIENTS.
- LACKS SERVER-BASED SECURITY AND ADMINISTRATION.
- REQUIRES 386-BASED PC; 4M BYTES OF RAM RECOMMENDED.

peer LAN operating systems. For example, Artisoft's LANtastic operating system supports DOS servers, 12 levels of security control, immediate print spooling, network troubleshooting and remote processing on servers as well as the ability to copy user accounts to a server, log users out of a server and disable server log-ins and diskless workstations. None of these features are in

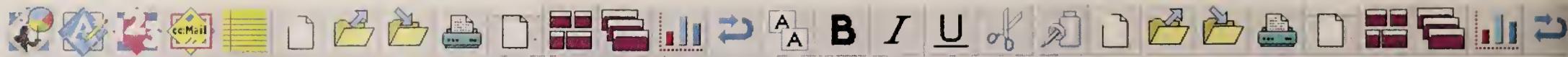
Windows, *Page 52*



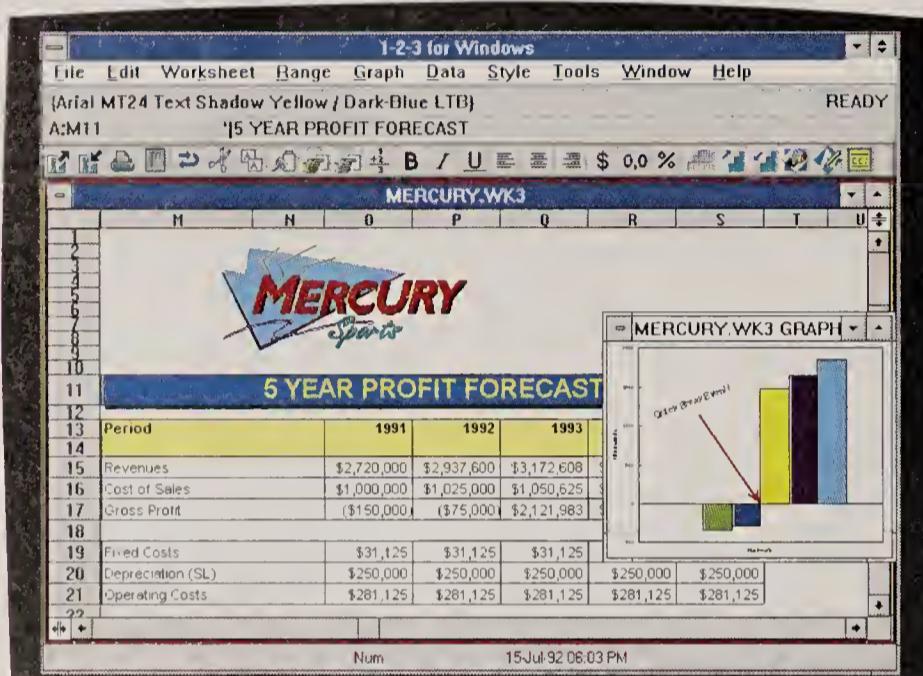
By the end of this week Computerworld readers will have spent over \$71.6 Billion on Information Technology this year — representing nearly half of all IT spending to date in 1992.

**COMPUTERWORLD**  
The Newspaper of IS

Source: IDG Research Services, Fall 1991



# Compared to Microsoft Office look

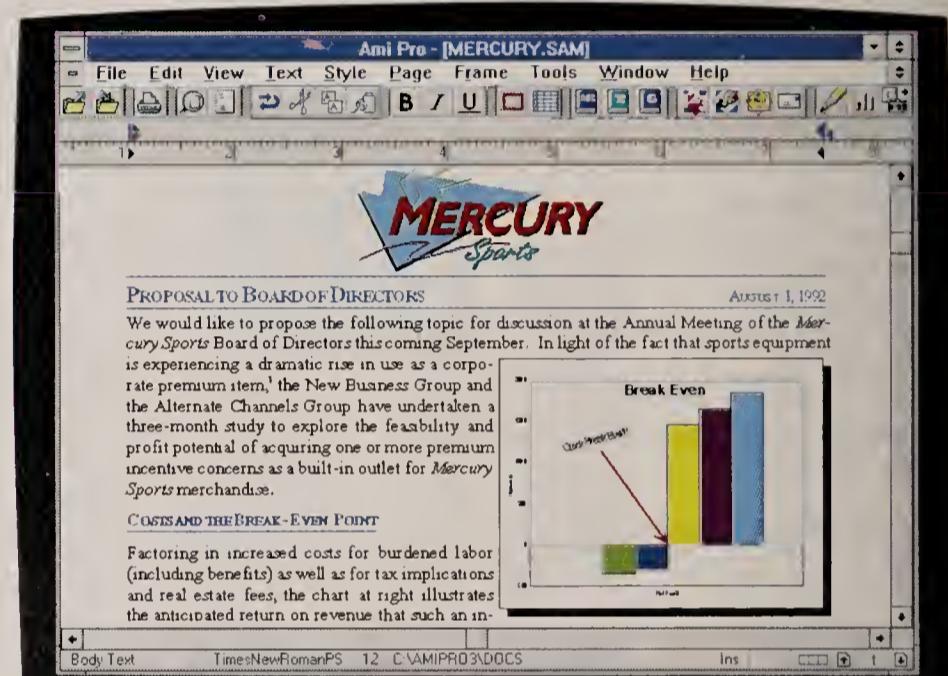


1-2-3 for Windows Release 1.1 now includes over 25 new features and usability enhancements.

It's true. When you evaluate our complete solution for Windows® desktops and then look at theirs, you'll see why ours is a better business choice.

Of course, both SmartSuite® and Microsoft Office include full-featured products. But SmartSuite has been recently updated to include 1-2-3 for Windows Release 1.1 with SmartPak® and the newly released Ami Pro 3.0, as well as Freelance Graphics® and cc:Mail.

All four of these award-winning products share a common interface as well as our innovative SmartIcons.™ So when

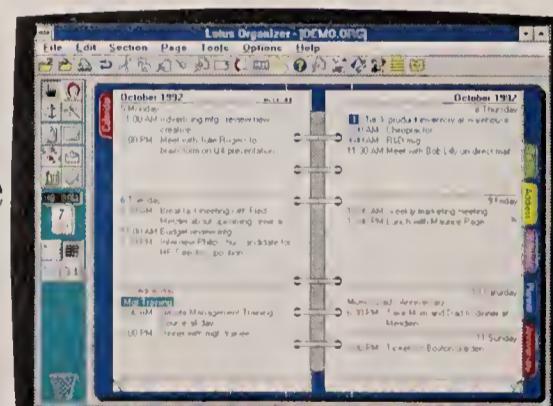


Ami Pro 3.0 includes new features that make it more powerful and easier to use than Microsoft Word for Windows.

you've learned one, you've learned them all.

What's more, SmartSuite delivers some truly unique integration capabilities that aren't possible with Office. All four SmartSuite products, for example, share data, text and graphs between each application smoothly and seamlessly. So when an outline produced in Ami Pro is imported to Freelance Graphics, it's automatically converted into a Freelance Graphics outline and full-slide presentation. And a 1-2-3 graph exported to Freelance Graphics will arrive, fully editable. Not so

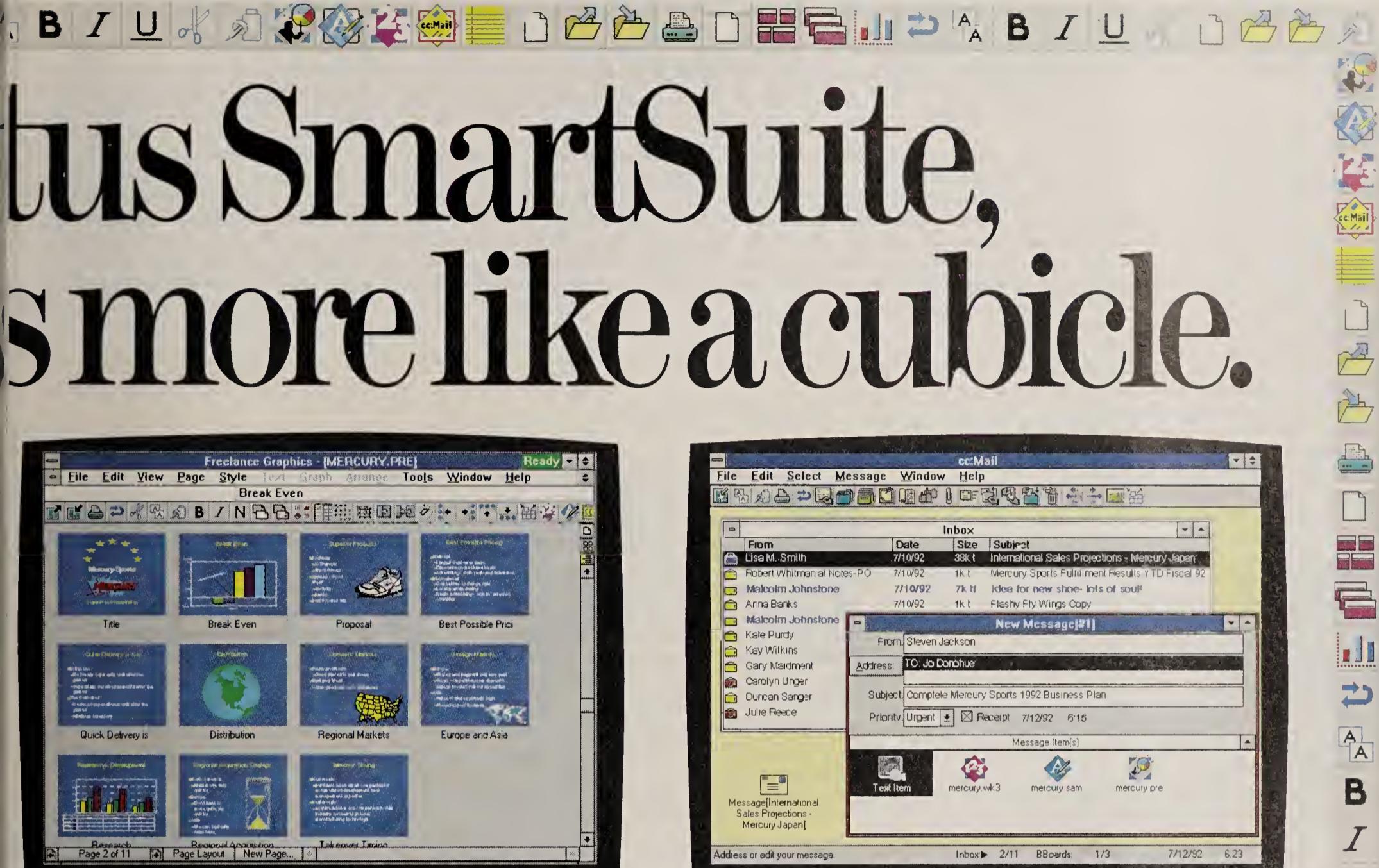
with Excel and PowerPoint. You can even move



For a limited time, SmartSuite includes Lotus Organizer, the computerized way to keep tabs on all your daily tasks.

1-2-3 for Windows Release 1.1, Ami Pro 3.0, Freelance Graphics, and cc:Mail are available while supplies last. \*\*Suggested retail value. \*\*\*In Canada, call 1-800-GO-LOTUS. When you purchase 10 SmartSuite packages, you get a free cc:Mail for Windows Platform Pack (a \$175 value). SmartMasters and Working Together are trademarks of Lotus Development Corporation. cc:Mail is a trademark of cc:Mail Incorporated. © 1992 SmartSuite Inc.





*Award-winning Freelance Graphics  
is the easiest, fastest way to create  
a stunning presentation.*

*cc:Mail, the world's leading LAN-based e-mail  
system, allows you to send documents across all  
major networks and computing platforms.*

quickly between SmartSuite applications just by clicking the icon of the application you want to open.

Better still, all SmartSuite applications are mail-enabled. So you can use cc:Mail to send "live" documents from within each application. Office, on the other hand, requires you to install and use an optional macro with Microsoft Mail 3.0.

## Why is now the best time to buy Lotus SmartSuite instead of Microsoft Office?

For one thing, you just can't beat the total

value. In fact, for a limited time,\* **when you buy SmartSuite, we'll give you Lotus Organizer™ (a \$149 value\*\*)** absolutely free. It includes an on-screen calendar, to-do list, planner, address book, notepad and anniversary reminder that are all fully integrated. Plus if you're upgrading from any version of 1-2-3, Symphony, any Lotus word processor or graphics product, or cc:Mail, you'll save even more. So do the smart thing. Visit your Lotus Authorized Reseller or call **1-800-872-3387, ext. 7238\*\*\*** for a free demo disk.

**Lotus**

**SmartSuite for Windows**

1-2-3, Ami Pro, Freelance Graphics, and cc:Mail

*To find out more about  
Lotus and Working Together™  
in Windows, visit Booth  
#2842 at Comdex.*



## Windows for Workgroups tough LAN competitor

CONTINUED FROM PAGE 49

Windows for Workgroups.

"Our primary goal in Windows for Workgroups was to make networking easy, which is why it's user-based, rather than supervisor-based, and lacks some of these administration capabilities," Siegelman said. "We made a conscious choice for simplicity and left the high-end LAN administration and management functions to the client/server LAN operating systems."

Peer-to-peer LAN operating systems also support more client types than Windows for Workgroups, which can only support DOS and Windows clients. Artisoft supports DOS, Windows, Apple Computer, Inc. Macintosh and Transmission Control Protocol/Internet Protocol clients, with OS/2 support scheduled for the spring. Sitka's 10Net LAN operating system supports DOS, Windows and Macintosh clients.

Windows for Workgroups contains client software for powerful client/server LAN operating systems, such as Novell, Inc.'s NetWare, Microsoft's LAN Manager and Banyan Systems, Inc.'s Vines. However, Windows for Workgroups will not work with peer-to-peer LAN operating systems such as NetWare Lite or LANtastic.

### Willing to sacrifice?

This means customers who want to upgrade to Windows for Workgroups may have to discard their simple, fairly robust peer-to-peer LAN operating systems and replace them with the more limited connectivity found in Windows for Workgroups. Also, in order to network Windows for Workgroups, it must be running on a 386-based PC, with a recommended 4M bytes of random-access memory—a hardware investment that many peer-to-peer customers may be unwilling to make.

"A lot of our customers are really attached to their current LAN operating system and are in no hurry to discard it," said Al Conway, president of ACG, Inc., a Dayton, Ohio, reseller of PC-based business systems. "Also, there are a lot of people out there who don't want to throw out their hardware and buy 386-based PCs to run Windows, when most of their applications are still DOS-based."

At first glance, Windows for Workgroups, at \$249 per PC, appears more expensive than LANtastic, which costs \$99 per network if purchased with Artisoft Network Interface Cards, or NetWare Lite, at \$1,995 per 10-node network. However, because Windows for Workgroups includes both network and desktop operating sys-

tems, it will actually be cheaper for first-time network installations.

Since Windows for Workgroups' debut, peer-to-peer vendors have been pooh-poohing Microsoft's impact on their sales.

"When Novell jumped into the peer-to-peer market, our sales went up because

that helped legitimize the peer-to-peer LAN operating system. We think the same thing could happen with Windows for Workgroups," said Jack Schouf, president and chief executive officer of Artisoft.

Industry watchers, however, are not so sanguine about the future of the peer-to-

peer marketplace.

Jodi Mardesich, a LAN analyst at The Burton Group, a Salt Lake City-based LAN market research firm, said, "Windows for Workgroups has got to be frightening the peer-to-peer vendors because it's going to affect their sales. How much it affects them depends on how good Windows for Workgroups is. The major peer-to-peer players, like Artisoft, Sitka and Tiara will survive; I think the smaller peer-to-peer companies may be in for rough sledding."

**21 MEGABYTE\***

New 3M Floptical® diskettes may look like ordinary 3.5-inch diskettes, but they offer over 28 times the capacity\*—at a low system and media cost.

As the world's largest manufacturer of media, 3M is a leader in producing the new Floptical diskette using a unique combination of magnetic recording and optical servo track technology. Optical tracks are engraved on the barium-ferrite media surface so the drive can read more data more precisely (1,245 tracks per inch vs. 135 on standard floppies). This not only gives you increased capacity but also improved reliability and performance.

**UP TO 24 GIGABYTE**

Co-developed by IBM and 3M, the new 3M ECart™ 1½-inch tape cartridge for the new family of 3490E drives delivers the same proven reliability you've come to expect from 3M 3480 cartridges—with up to twelve times the capacity of the original uncompact 3480 cartridges, a new shell and improved cartridge handling features.

You'll save time, money and storage space because a single ECart tape cartridge can now store more than two gigabytes of data.

**3M Floptical Diskette**

**3M E Cart™**  
3490E compatible  
1100 ft  
36-track

\*Capacity comparison based on nominal capacity between a 1MB formatted diskette and a formatted Floptical diskette. Products require compatible drives. Actual storage capacity may vary depending on drive and formatting requirements. "Magnus" is a trademark of 3M. "Floptical" is a registered trademark of INSITE Peripherals. ©1992 3M.

**COMPUTERWORLD**

**CAREERS  
ON-LINE**  
**508 879-4700**

with your computer/modem

# Law firm migrates from Wang

By Kim S. Nash  
CLEVELAND

The folks at *L.A. Law's* MacKenzie, Brackman have nothing on Jones, Day, Reavis & Pogue, one of the largest law firms in the world with 1,200 attorneys and 22 major

offices throughout the world.

However, with size come sizable problems, and Jones, Day has one. Forty VS minicomputers from Wang Laboratories, Inc. have become a source of concern with Wang floundering in Chapter 11 bankruptcy protection.

"We know there is stuff we'll want to do down the road, such as imaging, that the VS doesn't have the . . . power to handle now. And the future's not looking so good," said Bryan Burgin, systems analyst and software architect at Jones, Day.

But with an estimated \$50 million worth

of hardware, it is tough to turn on a dime. So the law firm has mapped out a two-year interim plan to transform VS processors into file servers for PC local-area networks, on the way to probably dumping Wang altogether.

Instead of tying itself further to Wang, the firm is replacing Wang electronic-mail, document management and word processing software with popular PC systems, such as WordPerfect Corp.'s flagship word processing package.

Approximately 3,000 PCs from various clone makers will run these packages but continue to access data on the VS boxes. That translation is made possible via Lightspeed NVS, a utility from third-party Wang supplier MacSoft, Inc. in Bakersfield, Calif.

Lightspeed, priced according to the number of VS processors to be accessed, acts as a go-between to help VS minicomputers talk to PCs. The product lets up to 32 PCs, Apple Computer, Inc. Macintoshes or Unix workstations share one Wang Local Office Connection board across a LAN to get at VS data.

"The VSs still work well, so why ditch them now?" Burgin observed.

However, the firm is committed to PC LANs, where availability of components "is more stable."

Because of the volumes of paper they generate, legal firms and departments are a major target for Office 2000. Wang's plan to sell imaging software and services. That a giant law firm such as Jones, Day is not interested does not bode well for the stay-alive scheme.

Jones, Day's server transformation project, dubbed VS LAN, has a budget of \$7 million. VS LAN was tested in two offices for about six months before formal rollout began early this month with shipment of installation kits to all major locations.

The law firm developed menus similar to those that end users currently see to make the change as invisible as possible, Burgin added.

Implementing VS LAN lets Jones, Day rapidly install PC products without changing business operations. The benefits are twofold. Users do not have to learn new procedures while they are being trained to use PCs. Plus, VS LAN lets the IS department migrate at a "sane" pace, Burgin said.

The Austin, Texas, office, where VS LAN has been in place since May, has reported quicker processing under the distributed architecture.

## ON SITE

**Jones, Day,  
Reavis & Pogue**  
Cleveland

**Challenge:** To preserve investment in Wang minis while downsizing.

**Technology:** PC LANs and MacSoft's Lightspeed, a PC/Wang VS interpreter.

**Results:** Two years of breathing room to retrain users and implement new technology.

storage solutions.  
ity you need.

128 MEGABYTE

1.35 GIGABYTE

With fast transfer rates up to 36 megabytes per minute and access times faster than 30 seconds, 3M 1/4-inch data cartridges offer a fast and reliable choice for data backup. In fact, no other backup media capacity is growing faster—along a planned migration path that will soon reach 10 gigabytes and beyond.

Whether you use our mini 1/4-inch data cartridges or need more capacity from 3M Magnus™ 1.35 gigabyte data cartridges, you'll find they're built for durable, reliable performance.

*More businesses protect important information on 3M brand data storage products than any other brand in the world. For more information call 1-800-888-1889 ext. 51.*

3.5 INCH REWRITABLE OPTICAL DISK 512 F

3M MAGNUS™ 1.35 DATA CARTRIDGE

1.35 Gbytes 760 II (231.6m)

Innovation working for you™

3M



AS/400

A registered trademark of Nippon & American Paint Products, Inc.



Vistakon realized  
its vision with AS/400s.

Perhaps you should take  
a closer look.

Vistakon's vision was clear. With their Acuvue® disposable contact lenses, this division of Johnson & Johnson Vision Products, Inc. already offered a popular product. But they also wanted to provide enhanced customer service.

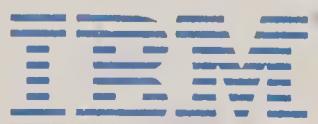
With CallPath™/400, Vistakon's telephone operations are now controlled by AS/400® computers, so customer data can be accessed instantly. As a result, accuracy of orders has increased. Length of calls has decreased, allowing more orders to come in. And 99% of their customer service calls are now answered within 20 seconds, keeping hang-ups to a minimum and customers satisfied.

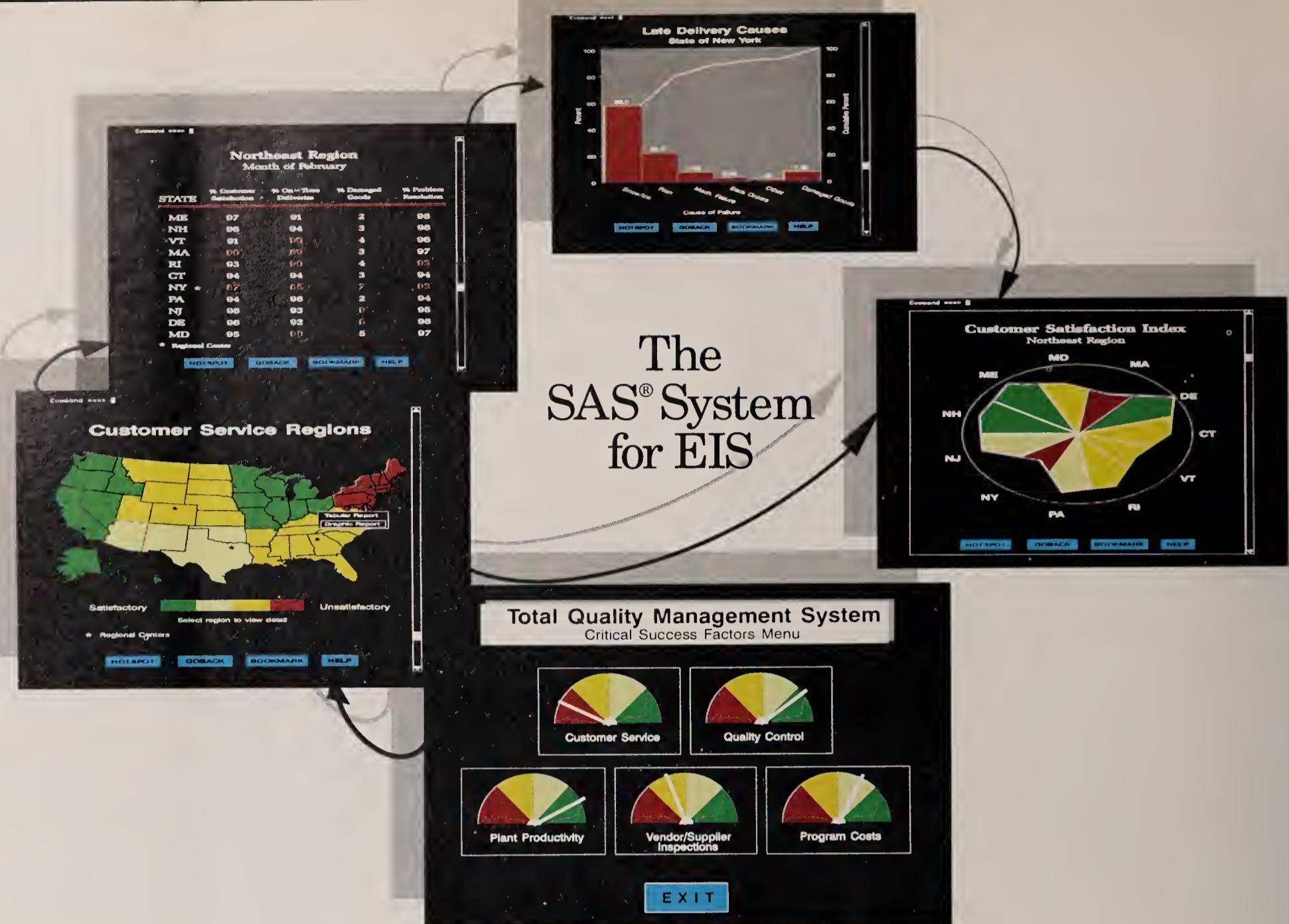
Of course, you don't have to be a contact lens maker to see things so clearly. All kinds of companies are looking to advanced AS/400 computer applications. Companies like Porsche® Cars North America Inc. are also using CallPath/400 to improve customer service. And companies like Purity Wholesale Grocers, Inc. and Omak Wood Products are using our advanced applications to fax invoices and information directly from their AS/400s, so they can service their customers better and reduce costs.

For free literature on how advanced AS/400 applications can help your company keep its focus, call 1 800 IBM-6676, ext. 733.

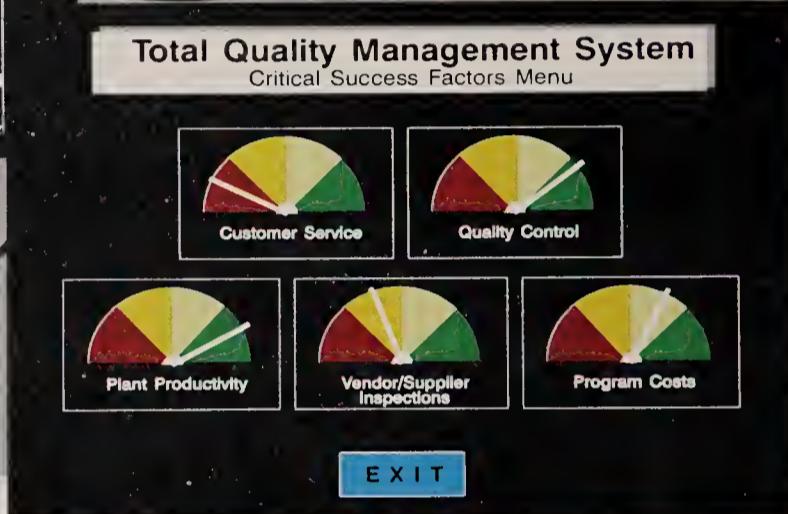
The IBM AS/400.  
Success isn't complicated.

- *CallPath/400: integrate telephone and computer capabilities.*
- *Facsimile Support™/400: manage and store faxes, reduce costs.*
- *ImagePlus®/400: faster document retrieval, lower storage costs.*
- *Multimedia: deliver interactive impact through PS/2® terminals.*





## The SAS® System for EIS



# The Difference Between Face Value and Real Value

It takes more than a fancy front end to make a full-function Executive Information System. To be of *real* value, an EIS must deliver the right information to the right people at the right time...to support strategic decision making. That's why you need the SAS System.

### Software that's Changing the Face of Information Delivery

Of course the SAS System gives executives such EIS "basics" as up-front menus...pull-down windows...drill-down, traffic-lighting, hot-spotting, and exception reporting...graphical display of critical success factors...and desktop productivity tools such as calendars, notepads, a letter-writing facility, and access to native electronic mail.

But the benefits of the SAS System extend far below the surface. As the world's leading information delivery system, the SAS System provides *total* control over data access, management, analysis, and presentation. Executives can directly access all kinds of data sources—including data locked away in database management systems. And they can analyze and present data using

specialized tools for project management, forecasting and financial reporting, and hundreds of other tasks...all fully integrated.

Information managers can build a custom-tailored EIS...in far less time, and using fewer resources, than it takes to force-fit an off-the-shelf solution into *your* organization. And because the SAS System is entirely portable, you can integrate data and applications from different computing environments into a single, company-wide information delivery system.

### Free Video Preview...Call Today.

There's more to the SAS System for EIS than meets the eye. Call us now at 919-677-8200 to arrange for your free video preview...plus details about a no-risk software evaluation and upcoming SAS System executive briefings.



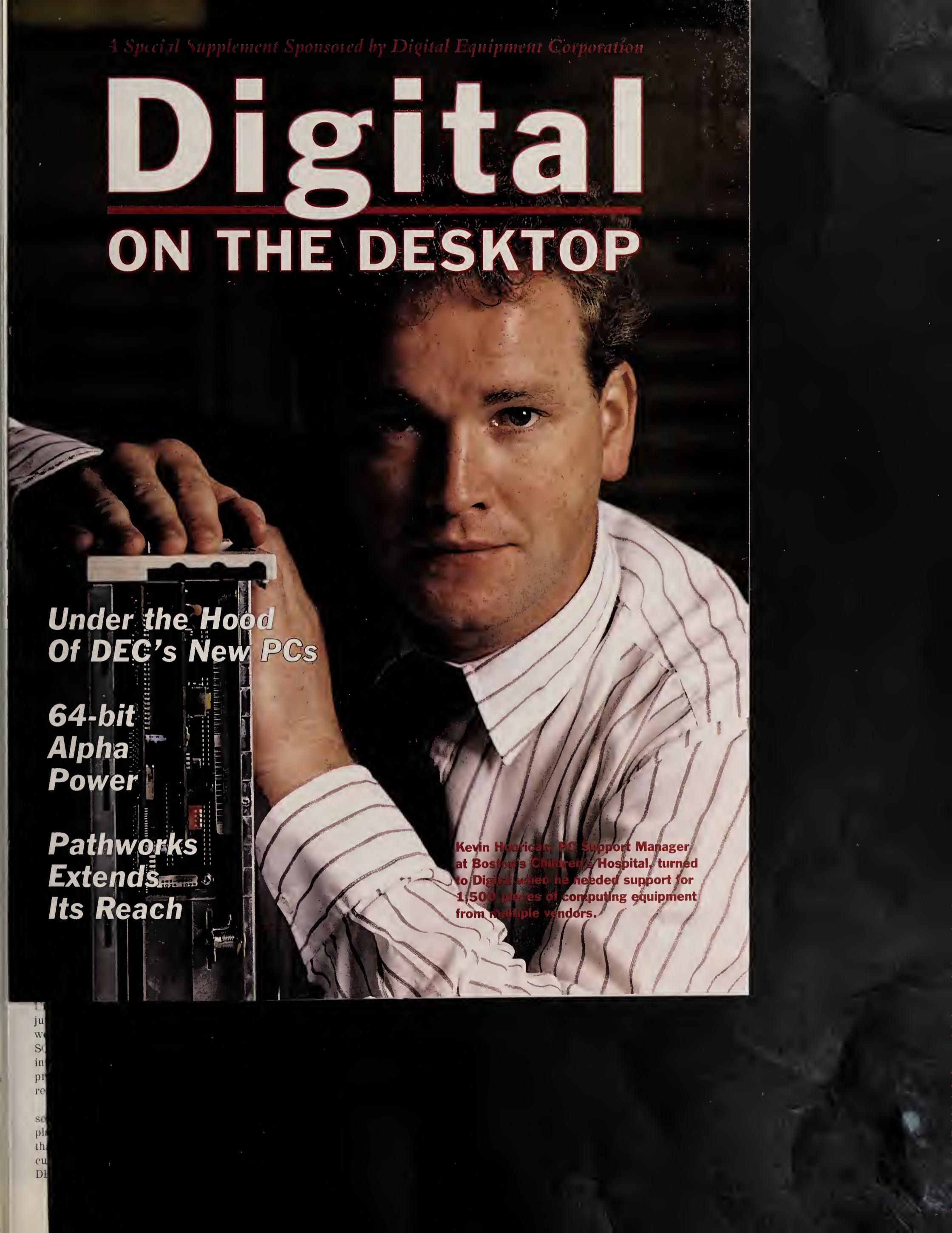
SAS Institute Inc.  
Software Sales Department  
SAS Campus Drive □ Cary, NC 27513  
Phone 919-677-8200 □ Fax 919-677-8123

A Special Supplement Sponsored by Digital Equipment Corporation

# Digital

---

## ON THE DESKTOP



***Under the Hood  
Of DEC's New PCs***

**64-bit  
Alpha  
Power**

**Pathworks  
Extends  
Its Reach**

**Kevin Hourigan, PC Support Manager  
at Boston's Children's Hospital, turned  
to Digital when he needed support for  
1,500 pieces of computing equipment  
from multiple vendors.**

# JULY 1992, PC MAGAZINE DESCRIBES THE PERFECT PC.

# SEPTEMBER 1992, DIGITAL MANUFACTURES IT.

"...if your ultimate PC system runs Windows, an accelerated VGA card can boost performance to 3 to 20 times that of a dumb frame buffer."

"For the utmost in display speed, look at local bus designs..."

"A high scale of chip set integration lowers cost and improves system reliability..."

"To save space, look for built-in parallel and serial ports, and IDE and video circuitry."

"Display adapters using VRAM...are often twice as fast as DRAM-based boards."

"To take advantage of a 32-bit operating system such as OS/2 2.0 or Windows NT (when it ships), you will want at least 8 MB of RAM, so a 16 MB motherboard may prove limiting in the next couple of years."

"Note that metal SIMM sockets are preferable to plastic ones."



#### DECpc™ 466d2 LP 486DX2 66 MHz System

- 4 MB RAM • 122 MB hard drive • 14" low-radiation Super VGA non-interlaced color monitor
- 3.5" 1.44 MB floppy drive • Keyboard, mouse • MS-DOS® and Windows™
- 128 KB writeback cache • Local bus video • GUI accelerator

When *PC Magazine* dreamed of the perfect PC, did they guess Digital was busy building it? Introducing the new line of DECpc upgradables. Built to satisfy your ultimate PC wish list. With a price list to match. For more information, call 1-800-438-4311. **digital™**



QUOTES REPRINTED FROM PC MAGAZINE, JULY, 1992. © 1992, ZIFF COMMUNICATIONS COMPANY.  
© DIGITAL EQUIPMENT CORPORATION, 1992. THE DIGITAL LOGO AND DECpc ARE TRADEMARKS OF DIGITAL EQUIPMENT CORPORATION.  
MS-DOS IS A REGISTERED TRADEMARK AND WINDOWS IS A TRADEMARK OF MICROSOFT CORPORATION.

# Digital Sizes Up the Desktop

This special supplement, prepared for Digital Equipment Corp. by editors and writers of the International Data Group, is meant to focus attention on the technologies and services Digital offers on the desktop.

While starting from a relatively small base, Digital has become one of the fastest growing vendors of PC hardware this year. In addition, Digital officials say revenues from its PC networking product, Pathworks, will soon overtake revenues from DEC's mainline VMS operating system.

DEC approaches desktop connectivity from the server down rather than from the desktop up – given its experience with wide area networking – and is seeking through Pathworks to provide a layer of integration services above the stand-alone PC.

To examine these technologies, we have organized this supplement into four sections: PC hardware, PC



**Desktop mainframe? Digital's 64-bit Alpha workstation.**

integration services, workstations, and X terminals/dumb terminals/other desktop services.

In the first section we try to explain how Digital can claim to speed up Microsoft Windows and ask both inside and outside sources how Digital is doing as a PC vendor.

In the second, Kevin Hourican of Boston's Children's Hospital and Nina Lytton of the Open Systems Advisor newsletter, explain how they use DEC's integration services.

In the third, workstation guru Don Gaubatz talks about the future of Digital workstations, then illustrates it by teleconferencing via his desktop machine.

The fourth section touches upon how dumb terminals aren't so dumb anymore and how a software architecture called DECprint can allow you to initiate a two-way conversation with a remote printer. ■

## Service and Low Prices Fuel DEC's PC Sales Growth

In January, Digital Equipment Corp. launched a massive direct marketing and mail-order PC sales program, slashing prices 50 percent. In its determination to compete, Digital cut prices an additional 30 percent in February and again in July.

The aggressive marketing and pricing appear to be paying off. Digital was the fastest growing PC vendor in the country in May and June and five times this year has appeared among the top 10, according to Computer Intelligence, a La Jolla, Calif., market research firm.

"Digital has stayed on the Up-and-Coming PC Vendors list longer than anyone in recent history," noted Dan Ness, senior industry analyst at Computer Intelligence, of Digital's five-month appearance there. In July it dropped out of the number one slot to number five, being replaced by Cumulus Computer.

In fact, Digital's overall PC sales for the fiscal year ending June 30 were 275-percent greater than its PC sales during the previous year, sources at the company claimed. InfoCorp of Santa Clara, Calif., tracks PC sales and says Digital sold 134,700 worldwide in the first six months of calendar 1992, compared to 69,660 for all of 1991. In the U.S. alone, the figures were 59,767 for the first half of '92 compared to 31,105 for 1991,

according to analyst David Carnevale.

However, reports of rapid growth of PC hardware sales are based on increases in a relatively small installed base. Digital barely cracked the top 20 in overall sales and it accounts for slightly more than 1 percent of the domestic PC market, according to Ness.

On the other hand, Digital's revenues from PC-related sales of software and networking like Pathworks, its PC-to-host and LAN-to-WAN package, boost its total revenue take. InfoCorp estimates DEC PC revenues, including software and peripherals as well as hardware, at \$423 million in the first half of 1992, compared to \$261 million in 1991. PC-related sales are one of Digital's fastest growing areas of revenue, analysts said.

Digital's effort through the first half combined the competitive pricing strategy of fast-growing PC makers such as Dell Computer Corp. with free, onsite service for a year and the Desktop Direct, 1-800-PC-BY-DEC, quick delivery number. Since Aug. 25, it has been offering its Low Profile line of PCs that it manufactures itself with a modular, snap-in-CPU upgrade capability.

"The sales reps know the products and

can explain them in a way that makes sense," said Mike Luckenbach, an MIS manager at Asea-Brown-Boveri, a Windsor, Conn., electrical power systems and nuclear fuel manufacturer.

Through Desktop Direct, Digital has increased the company's customer base by more than a third, said John MacGilvary, Digital's U.S. PC sales and marketing director.

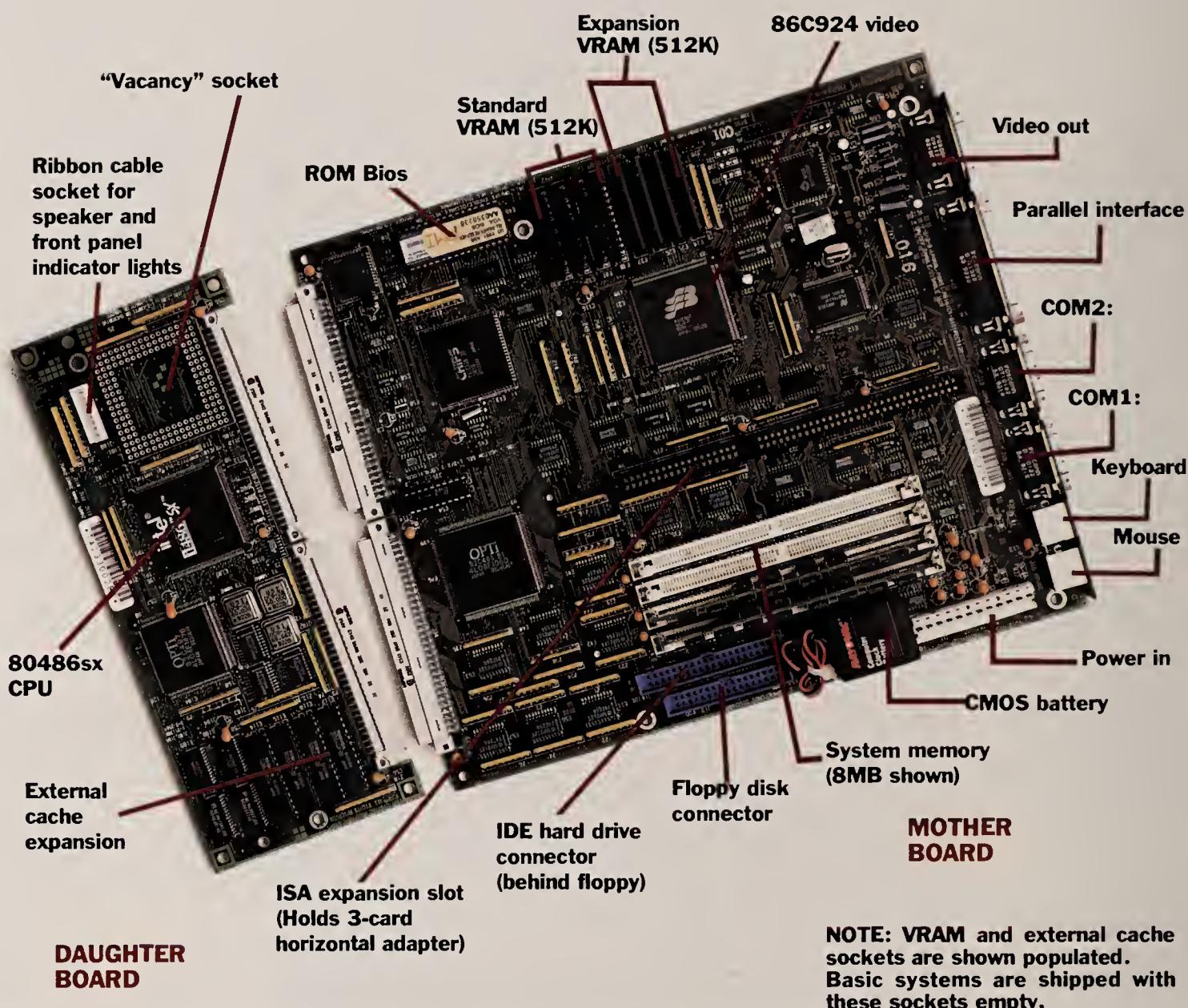
On June 26 Dell reduced prices on a line of PCs, prompting other clone makers, including Advanced Logic Research Inc. and Hyundai Electronics, to follow suit. Digital's latest cuts came soon after. It likewise priced its LP line of PCs aggressively.

Both MacGilvary and Computer Intelligence's Ness believe Digital's reputa-

tion as a service provider rather than low prices has fueled the accelerated growth in PC sales. "Right now we're the only manufacturer delivering our own onsite support services," he said. Clone makers supply a similar service through third parties like TRW. Ness added, "It's hard for a smaller company to offer that kind of service." ■

*Cover Photo Copyright 1992 by Seth Resnick  
Design: David Grober and Thea Shapiro*

# Inside the 425sx LP



## DECpc 425sx LP technical reference

(Note: Many of these features are common to the other units in the LP line)

**CPU:** 80486SX at 25 Mhz

**Standard Memory:** 4-MByte system memory; 512-KByte virtual RAM video memory

**Maximum Memory:** 64-MByte system memory (8 MBytes as evaluated); 1 MByte VRAM video memory\*

**External Cache:** 128 KBytes; expandable to 256 KBytes\*

**Jumper System Clock:** 25\*, 33, 40, 50 Mhz

**Storage:** 122-MByte IDE hard disk; 1.4-MByte, 3.5-inch floppy disk

**Video:** SVGA-compatible adapter with graphics accelerator on mother board

**I/O:** All I/O on mother board: IDE and floppy controllers, two serial ports, one parallel port and one mouse port

**Expansion:** 3- x 16-bit, full-length ISA slots

**Internal Drive Bays:** Two (one free in basic configuration)

**External Drive Bays:** Two (one free in basic configuration)

**Case:** 3.5 x 16.1 x 15.6 inches (90mm x 410mm x 396mm)

**Standard Software:** MS-DOS 5.0, Microsoft Windows 3.1, DiagSoft QAPlus diagnostics, drivers and system utilities

**System BIOS:** Phoenix

**Video BIOS:** AMI

**Power:** 145 Watt, auto-sensing supply with 100-240VAC input

**Warranty:** One-year, money-back guarantee

**Maintenance:** 1-year on-site maintenance

\*Configuration as evaluated

# DEC's New PCs

*Low Profile line  
speeds up Windows  
and offers modular  
upgrade capability*

By TOM BADGETT

**D**igital Equipment Corp.'s 425sx LP is among the front runners in the company's new line of high-performance, low-cost, upgradeable PCs.

Notice the individual components of that description. The LP in the product name stands for low profile, a reference to the narrow case that makes this line of PCs look more like terminals than PCs.

The high-performance part refers not only to the 25-Mhz 80486sx CPU that drives this machine, but also to an internal design that runs some programs especially applications for Microsoft Windows — faster than competitive hardware. Screen updates for the typical Windows application running on an LP PC will be four times faster, and WordPerfect will be up to 10 times faster.

This speed is achieved by using a graphics accelerator and local bus video to connect the video processor directly to the CPU. That means the video-to-CPU communications are conducted at the CPU speed — 25 Mhz in the case of the 425sx LP — rather than at the much slower 8 Mhz of the conventional PC I/O bus. (See accompanying story on video technology, page 7.)

And, low cost means what it says. Although the Digital of yesterday was not known for competitive prices, this new line of PC offerings is competitive in features and price. The 486sx LP package, for example, includes 4 MBytes of memory, an SVGA (Super Video Graph-

ic Array)-compatible display adapter, a 3.5 inch floppy drive, 122-MByte hard drive, keyboard, mouse, DOS 5.0 and Windows 3.1 for \$1,649. Similar LP packages range from \$899 for an 80386-based system to \$2,199 for a 66-Mhz, 80486-based system.

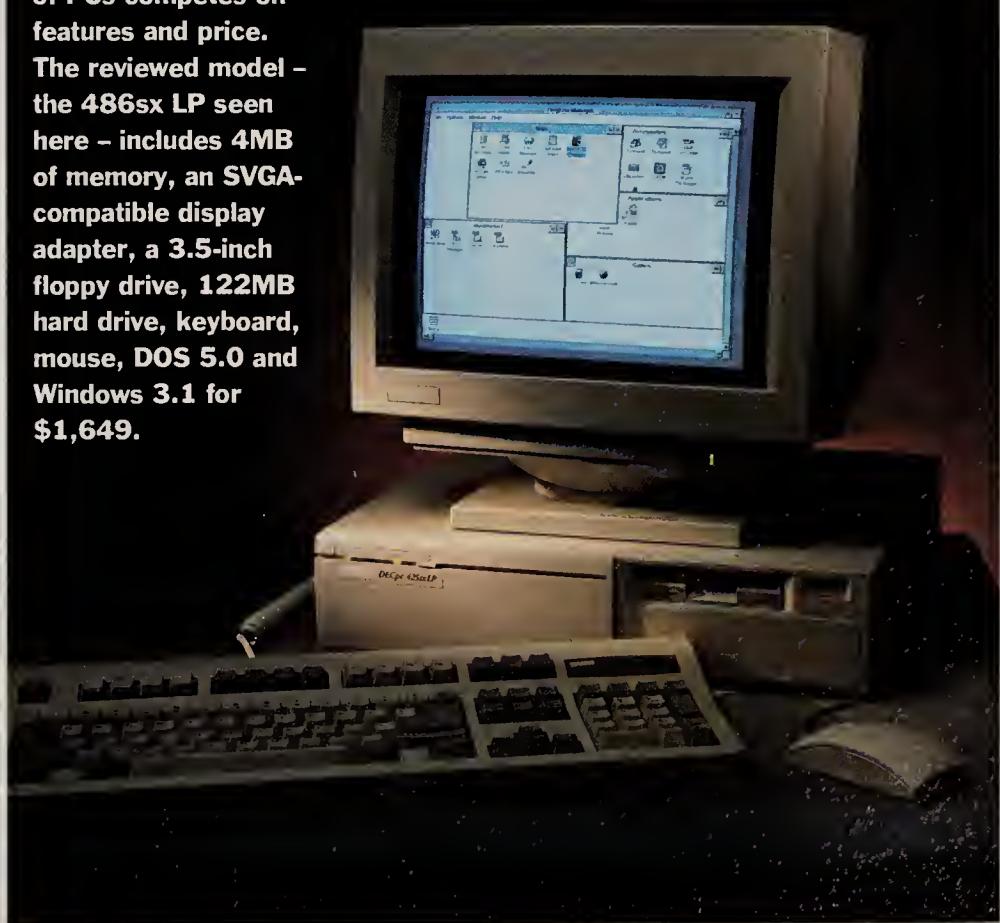
All one needs to get these systems up and running is a video display, also offered by Digital and available from a number of third-party suppliers as well.

The LP line includes a range of processor options, from the low-end 80386sx to the high-end 66-Mhz 486. The machine we evaluated used a 25-Mhz 80486sx. The 486sx is a replacement for the 386DX microprocessor, the high-end chip in the previous processor line. The 486sx chip is a scaled-down 486DX. The DX model includes internal math

co processor circuitry; the sx doesn't. The original concept of this design was to provide users who do not need high-speed math operations with a lower-cost alternative to the DX chip. An obvious application for this type of chip would be in a network server, for example, where resource and application sharing are more important than number crunching.

The marketplace has chosen broader applications for the lower-cost 486 chip, however. The 486sx certainly is not relegated to just server applications. And the reduced complexity of the sx-series chip lowers system cost enough to make it an especially attractive choice for applications that require reasonable speed, technology compatibility and the lowest possible cost.

**Digital's new line of PCs competes on features and price. The reviewed model — the 486sx LP seen here — includes 4MB of memory, an SVGA-compatible display adapter, a 3.5-inch floppy drive, 122MB hard drive, keyboard, mouse, DOS 5.0 and Windows 3.1 for \$1,649.**



Photos by Rhea Ripley

The 486sx series uses some of the same clock speeds as the 80386DX line and is priced competitively with it. However, a 486sx running at the same speed as a 386DX is faster because its internal design is more efficient. In fact, Intel Corp. tests show that a 486sx can work twice as fast on some tasks as a 386DX running at the same clock speed. And, whereas an 80386DX running at a faster clock speed could approach the performance of a 486sx at a lower cost, some tests have shown that a 25-Mhz 486sx can be up to 40-percent faster than a 33-Mhz 386DX.

Couple the speed issue with the fact that the 486 line is a newer technology and may offer easier and better upgrade potential, and Digital's 486sx-based PC is an excellent CPU choice for performance and price.

The Digital 425sx LP is a compact, low-profile computer with a lot of logic packed onto the mother board. You won't need an additional display adapter, for example, and the controllers and ports are all on the mother board. Conse-

quently, there are only three available slots, which are turned sideways to keep the case slim.

The configuration of this machine is attractive. The low-profile box fits easily under the monitor on a desktop. Its rounded corners and uncluttered appearance make it look less like a high-tech PC and more like a terminal. The integral power supply fan is extremely quiet, thus the system easily fits into a crowded office environment.

### CPU on daughter board

The machine's mother board is small (roughly 8.5 x 14 inches) and positioned in the left side of the case. The internal hard drive and floppy disks partially cover the right side of the mother board, which means one has to remove installed drives to upgrade system cache.

Similar to other members of the LP family (except the entry-level 386sx model), this machine uses a daughter-board arrangement to hold the CPU. The board attaches to the front of the

mother board via a set of pin connectors and lies parallel to it. This flexible design lets Digital use a common mother board and other building blocks for the whole line, changing only the daughter board to build models.

The daughter board in the LP line includes a separate 169-pin upgrade socket. You can use this socket for a math coprocessor on the 486sx model or to install a faster 80486DX chip or a clock doubler chip in any of the upgradeable machines. (See story below.)

Interestingly, the LP series does not include a SCSI or network interface. Rather, you have to plug in a separate SCSI adapter or a network interface into one of the available expansion slots. This keeps the initial cost of the machine low and makes it so that only those users who really need SCSI pay for it.

However, you would normally expect to find at least a network interface and perhaps a SCSI port on a Digital machine.

System software is pre-installed; therefore, you can plug in power, attach a

## Need To Upgrade? It's a Snap

All members of the LP family except the low-end 80386sx model, can be pumped up to faster, higher-performance machines. The 40-Mhz 80386DX unit, for example, can be moved to any of the 486 models simply by replacing the daughter card. Any of the 486 models can be upgraded easily by plugging a faster CPU in the vacancy socket. The speed of the 486 processors can be doubled using Intel's clock-doubling chip.

The DX2 chip doubles the internal processing speed of the onboard processor. A 16- or 20-Mhz system operates at 50 Mhz; a 33-Mhz system operates at 66 Mhz. The speed doubling takes place on internal calculations. Data is moved from the CPU to the rest of the system at the existing system speed.

The so-called "upgrade" socket is becoming a common feature with new PCs, and Digital's LP line is no exception. This 169-pin "overdrive" or "performance enhancement" socket (Digital calls it a "vacancy" socket) enables users to plug in an overdrive chip, which is essentially an enhanced 80486 microprocessor with DX2 clock-doubling circuitry.

The overdrive chip disables the

existing CPU and takes over at a higher speed. The overdrive chip includes a math coprocessor as well as Intel's DX2 speed-doubling technology. This means it operates at twice the system clock speed internally, but still communicates with the rest of the system at the existing system speed.

Two overdrive chips are available, one to upgrade 16- or 20-Mhz systems and another to spark up 25-Mhz systems. The 25-Mhz version includes a heat sink to help dissipate the additional heat generated by high-speed CPU operation. The overdrive concept helps users upgrade their own systems. Since the existing CPU does not have to be removed, you can upgrade to a faster CPU by plugging a chip into the extra socket.

### Adding a coprocessor

You can use the vacancy socket on Digital's LP machines in two other ways as well. If all you need is enhanced math performance, you can also plug in a math coprocessor in sx systems. (Remember, the sx chip's internal math coprocessor is disabled). And, you can plug in a higher-speed 80486DX CPU. In this case, the onboard CPU is disabled and the new

upgrade processor takes over.

Remember that while the upgrade process lets you speed processing on your existing system, such an upgraded system will not run as fast as one designed from the ground up for 50- or 66-Mhz operation. The reason is obvious. When you plug a 50-Mhz chip into a 25-Mhz system, the computer's memory, BIOS and controllers still operate at the original system speed.

A full-blown 50- or 66-Mhz system, on the other hand, includes memory and other components rated at the speed of the processor. How much these considerations affect actual throughput depends on your applications, primarily, but you should be aware that there will be differences. At the same time, however, a 50-Mhz chip in a 25-Mhz system should provide noticeable performance improvements, especially when your applications are compute-intensive as opposed to I/O-intensive.

The CPU daughter board on the LP machines includes additional sockets for expansion. The base unit comes with 128 KBytes of external, adaptive write-back secondary cache. You can plug in an additional 128 KBytes of cache for even more speed. — T.B.

monitor, keyboard and mouse, and be up and running in a few minutes. Licensed copies of MS-DOS 5.0, Microsoft Windows 3.1 and other utilities are included with the package, but you don't have to install them unless you change drives or crash some software.

In keeping with Digital's ongoing push for broader markets, the LP series will be offered through some conventional PC outlets, including national distributors and perhaps even mail order. Digital's Desktop Direct sales organization will market the machines (1-800-PC-BY-DEC), and they can be ordered through other Digital sources. But look for the DEC name to appear in places it hasn't before, too. As this was written, no one at Digital would say which sales organizations may carry the machines.

Digital designed the LP series for easy upgrades to higher performance. You can plug in a faster CPU daughter card or double the clock speed with one of Intel Corp.'s clock doubler chips. An interesting aspect of the Digital design is onboard clock-speed jumpers. All of the normal clocks are built into the mother board, so, for example, to upgrade a 25-Mhz system to a 33-Mhz system, you can change the jumper, plug in a new CPU, upgrade memory (if necessary), and you're up and running with a faster machine.

The machine is supplied with a quick-start guide, a fairly detailed user manual, separate instructions on upgrading the CPU and memory, as well as software documentation. Overall, the DEC documentation is better than many competitive products we've seen. Detailed drawings and charts help you locate jumpers, sockets and switches. You'll have to get support telephone numbers when you buy the machine, however, because no information on this is included with the package we evaluated. And, there is no technical reference manual with the system, nor is one available from Digital.

### In summary

The overall impression this newest Digital PC makes is good. The package is attractive and performance is excellent. And, Digital's worldwide sales, shipping and maintenance organization makes these PCs attractive to multinational corporations that want system compatibility and single-source supply. The DECpc 486sx LP we evaluated is a good performer, appears to have quality construction and is competitively priced. ■

*Tom Badgett is a principal of Word Association Inc. and the author of several books on PC computing.*

# Chip Design Speeds Microsoft Windows

Among the features Digital Equipment Corp. is pushing for the LP line is improved performance with Microsoft Windows — at least four times faster, according to the company. Actually, your own experience with Windows could be even better, depending on the applications you run.

How do they do it? It's all in the chips. The LP mother board includes VGA (Video Graphic Array)-compatible video circuitry based on the S3 Inc. 86C924 graphics accelerator. This chip was designed from the ground up to improve the performance of Microsoft Windows. This is done in two ways.

First, the chip includes eight of the most common Windows commands and procedures — such as moving boxes and redrawing the screen. A separate software driver captures these commands when they are issued and, instead of sending the commands to system memory for processing by the main CPU, they are sent to the accelerator chip. There, the procedures are processed directly in hardware and the results sent to the screen without passing through conventional system RAM and without the main CPU stopping what it was doing to process these video messages.

Systems without the accelerator have to pass video data back and forth across the 8-Mhz I/O bus, in and out of memory. With the 86C924, that step is skipped for most operations, speeding Windows considerably. And, although Digital suggests an improvement of four times, experts at S3, which built the chip, say you can expect eight-times-or better performance with some software. WordPerfect for Windows, for example, is notoriously slow in screen scrolling. S3 said to expect 10 to 20 times better scrolling in WordPerfect with the Digital LP video technology.

Our tests confirmed this claim. Large documents with WordPerfect for Windows are all but unmanage-

able with the standard system we used, a 33-Mhz 80386DX machine with 8 MBytes of system RAM and a 1-MByte SVGA board running at 1,024- x 768-pixel resolution. WordPerfect on the DECpc 425sx LP, on the other hand, scrolls rapidly, even updating text boxes and image files integrated within a document in real time without the familiar (and frustrating) wait for screen updates.

One design feature improves performance in the Digital machines over conventional competitive models: the use of VRAM in the video circuitry. VRAM is dual-ported memory that lets the system update the screen and pull in new video data at the same time. Conventional dynamic RAM-based systems handle only one operation at a time: write the screen or gather new data for display.

### Cost is negligible

And, while it is true that the graphics accelerator and VRAM technologies cost more than conventional SVGA adapters, the actual retail cost differential is less than \$200 for add-on options. When incorporated with Digital's machines, the additional cost is probably negligible.

When the most common Windows functions are executed, the I/O bus is bypassed and performance is improved. What about the other calls, and what about when you load an image from disk, which requires CPU and main memory interaction? The Digital technology speeds these operations by using the local bus instead of the I/O bus. The local bus is a direct connection between the CPU and the video card that transfers data at system speed rather than the lower, 8-Mhz I/O bus speed. On a 33-Mhz system, this communication takes place at 33 Mhz, for example.

This is a feature you cannot easily add to existing systems, but when incorporated into a new mother board, it is a sensible and cost-effective addition. — T.B.

# Speaking with James Liu

*James J. Liu, vice president of Digital Equipment Corp.'s Personal Computer Business Unit in Acton, Mass., was named to succeed John Rose as head of the Personal Computer Business Unit in July.*

**Digital is coming into a crowded market saying it can compete by producing its own PCs. What makes you think you can pull it off?**

"We started out looking not only at quality but also at reducing the cost throughout the whole operation. We broke the cost structure down into a manifest – design/engineering through manufacturing, warehousing, distribution, promotion.

"The PC business is a high-volume business. It is very important that you look at inventory, pipeline and obsolescence of technology costs. These are three very important areas of expenses. What we did in design/engineering was [to turn] the design into a modular approach so that you can turn the design into a new product by replacing only a tiny portion of the CPU daughter card. You do not have to redesign the whole thing. You do not have to scrap the whole thing.

"We have the same boxes for the whole product line. The power supplies are the same. The floppies and hard disks are all the same. So upgradeability from the current model requires a minor change of the daughter card.

"We also have a vacancy socket into which you can plug in an [Intel Corp.] clock doubler chip to double the frequency from 33 Mhz to 66 Mhz. The daughter card and vacancy socket are double protection for our customers, which is unique in the industry.

"We also use advanced S3 video chips [S3 Inc. 86C924 microprocessors], which give you the best video performance, because now the chips interface directly from the CPU to the local bus – at a bandwidth three or four times that of the EISA [Extended Industry Standard Architecture] bus. You take advantage of very fast CPU performance in terms of the video display. We bring the power of the CPU to the customer – that's our added value. If you go through the EISA bus, you have a limitation on how much you can do. Even if you have a fast CPU, it doesn't help you much if your video is slow.

"The other thing we do is use a quiet fan, with variable speed. It makes the office a much quieter place to work."

**If your PCs have these differentiators, how are you going to produce them at competitive prices?**

"We did everything we could to reduce the costs of producing these PCs.

"We call it the franchise model. We ship all the components – the CPU, the mother board, the disk, the floppies – to the market for final assembly. We bring them from whatever geography makes sense to supply a particular component.

"It's very much like a McDonald's restaurant. You buy the beef, the napkins, the tablecloth and ship them to the restaurant, where they control the quality. You bring the final assembly point closer to the customer and that will guarantee the quality when you deliver the product. It's very much the same as delivering a hamburger or cheeseburger.

"My inventory can be minimal. I can stock all common components. The only thing that is different is the daughter card. We also reduce the cost of freight and duty because now you ship them by subassembly. [Lower duties are paid on imported parts than on fully assembled products. – Ed.]

"The CPU daughter card is an expensive, small item that I can ship them by air and reduce the pipeline time from 21 days to only five days. My inventory cost will be less. Bulky components, the monitor, the box, etc., can be shipped by sea. Those components change more slowly, so that fits my model very well. In the PC business, inventory is a very important part of your business. A PC can become obsolete very quickly. When the technology changes, we can change very fast.

"We've tried to learn from what McDonald's did in the restaurant business. It's very similar. We developed a cookbook for each country for final assembly, so the product will be consistent. We're the only company that can do that."

**Don't you still have a cost conflict between low-priced PCs and doing all the things that Digital wants to do in producing computers?**

"Quality doesn't mean higher costs. Quality means more knowledge and skills. For example, when you pass a mother board through the soldering process, the control of the temperature determines the quality of the soldering. A young company does not have 35 years of manufacturing experience to control the temperature flow. That doesn't cost you money. It costs you knowledge and skills, and that's how we can build a quality product without incurring more costs." ■



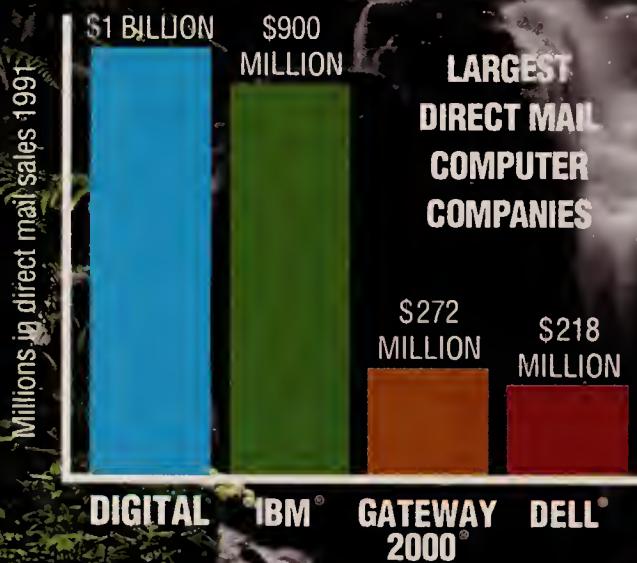
**We did everything we could to reduce the costs of producing these PCs. We ship all the components to the market for final assembly.**

DESKTOP  
INCOMPATIBILITY  
CAN MAKE LIFE  
AT THE TOP  
A LITTLE TOO  
HOT.

# MAYBE THAT'S WHY SO MANY PEOPLE WANT DIGITAL ON THEIR DESKTOP.

“Digital Equipment Corporation racked up \$1 billion in catalog revenue last year, toppling Dell Computer as the computer industry's top mail-order seller.”

— USA Today, August 7, 1992



digital

# EVERYTHING WORKS TOGETHER. AND WE MEAN EVERYTHING.

## "Network Certified by Digital." More than

**a seal of approval.** It's a statement of fact. Pure and simple. It's what separates Digital from the crowd.

Even today, when most companies are building products that can connect, Digital builds to a higher standard: *Integration*. The only standard that saves *you* from

**"...Digital had the combination of engineering expertise, experience in systems integration, and worldwide quality control standards that we were looking for. Equally important was the assurance Digital could give us on maintenance.**

**We can't risk anything going wrong in the middle of a trading session."**

— Richard Heckinger, Hong Kong Stock Exchange

unhappy users and lost time and money when your LAN goes down.

In these headline making days of PC company cost-cutting maneuvers and substandard components, only Digital continues to have the technology, alliances and commitment to guarantee integration in today's complex multi-vendor environments — and tomorrow's.

Some people tell us we're too obsessed with integration. Too much the engineers. So be it. At Digital we still believe in taking the heat — so you'll never have to.



### **DECpc 333sx LP**

i386SX 33MHz System

- 64KB Cache • 4MB RAM
  - 122MB Hard Drive
  - 14" VGA Color Monitor
- 3.5" 1.44MB Floppy Drive
  - Keyboard and Mouse
  - MS-DOS 5.0 & Windows 3.1

**\$1,549**

**We take the heat. So you'll never have to.**

In the real world not everyone calls Digital for *all* their desktop product needs (yet). We recognize you buy servers from here, math coprocessors from there and entirely somebody else's PCs—somewhere else.



Which is why we built our own labs to test interconnectivity back in 1985. Since then, every Digital desktop product is network tested with every other industry standard machine available, from IBM® PS/2® and OS/2® to COMPAQ®, Sun Workstations® and Macintosh®. We operate a 70,000+ node network that runs our company—and tests our PCs. We even test applications between different networking configurations.

In fact, Digital's networking lab is so highly regarded in the industry that other manufacturers now hire us to network test *their* PCs and printers.

### **Every Digital PC Includes:**

- Factory Installed MS-DOS 5.0 & Windows 3.1
- 30-Day Money Back Guarantee
- One Year On-Site Service (Return-To-Factory Service only for Notebooks)
- Leasing Now Available
- 24-Hour FAX Support
- Free Shipping

# NOBODY BUILDS PCs BETTER. BUT DON'T TAKE OUR WORD FOR IT. TAKE THEIRS.

**"DECPC BESTS LOW-COST 486DX FIELD.  
PERFORMANCE, EXPANDABILITY AND DESIGN  
STAND OUT...Digital Equipment Corp.'s  
system was the overall winner in  
PC Week Labs tests..."** — *PC Week*, October 5, 1992

PC WEEK  
LABS

## Scoreboard

Based on a scale of 1-5 (5=excellent).

	Advanced Logic Research Inc. <i>Flyer 32DT 4DX/33</i>	AST Research Inc. <i>Bravo 4/33 Model 123B</i>	Dell Computer Corp. <i>Dimension 486DX/33</i>	Digital Equipment Corp. <i>DECpc 433dx LP</i>	IBM PC Co. <i>PS/1 Model 2155-S76</i>	Zenith Data Systems <i>Z-433DX Model 200</i>
Overall weighted score	3.6	3.5	2.4	4.0	2.8	3.4
1. Price vs. performance (30%)	4	4	2	4	3	4
2. Performance (25%)	3	4	2	4	3	3
3. Expandability (25%)	4	3	3	4	2	3
4. Serviceability (10%)	3	3	2	4	3	4
5. Quality of construction (10%)	3	2	3	4	3	3

1. Overall performance relative to cost (comparative among these six machines). 2. Overall comparative system performance in all tests. 3. Support for processor, memory, storage and expansion board upgrades. 4. Ease of processor, memory, storage and expansion board upgrades. 5. How well the system is assembled (including case design, power supply and tools required for assembly).

No PC can network effortlessly unless it can distinguish itself as an incredible standalone.

Which is why Digital uses the *best* technology available. Like *high-volume data highways* to keep microprocessors up to speed. *Writeback cache* instead of standard cache (Writeback is the most advanced memory-catching strategy in the industry). *Built-in GUI accelerators* to make Windows™ run at speeds four times that of standard VGA. And VRAM instead of DRAM in our new upgradables for speeding up video and minimizing bottlenecks.

We've even got another advantage built in. *How* we build our PCs. Because Digital is one of only a handful of companies in the world to build PCs in an ISO 9000 compliant factory.



NETWORK  
CERTIFIED  
DIGITAL

### DECpc 433dx LP

i486DX 33MHz System  
• 128KB Cache • 4MB RAM • 122MB Hard Drive • 14" Low Emission SVGA Non-interlaced Monitor (supports up to 1024 X 768) • 3.5" 1.44MB Floppy Drive • Keyboard and Mouse • MS-DOS 5.0 & Windows 3.1

**\$2,299**

Call for availability!



#### DECpc 425sx LP

i486SX 25MHz System  
• 4MB RAM • 122MB Hard Drive  
• VGA Color Monitor (14", 0.29mm)  
• 3.5" 1.44MB Floppy Drive  
• Keyboard and Mouse  
• MS-DOS 5.0 & Windows 3.1  
• Fully Upgradable

**\$1,999**

Monitor may differ  
from that shown

**An integration strategy only Digital can deliver.** "Experience in networking" are three words most commonly associated with Digital. That's because our passion for integration never allowed us to settle for mere compatibility.

Which is why when it comes to developing solutions for making the right information available to the right people at the right time in the most useful form — regardless of geography, hardware or software — Digital should be your first choice.

And with Digital, you don't have to pay for solutions you may never need. We can customize our services to your environment and your needs.

No matter how complex — or how simple.

## "I think they're a winner."

— Andrew Seybold, Editor-in-Chief  
*The Outlook on Professional Computing*  
August 24, 1992

**Even if Digital doesn't manufacture it, our service makes it work.** Take these three basic examples of Digital's integrated service thinking:

[Our Multivendor Service Plan](#) gives you expert coverage for more than 8,000 hardware and software products from more than 800 different manufacturers.

[Our Hardware Service Plan](#) puts the expertise of more than 40,000 technical experts worldwide at your fingertips — whether you're using Apple®, IBM, COMPAQ, (or Digital), to name a very few of the vendors it covers.

[Our Software Support](#) for more than 100 popular applications from Microsoft®, Banyan™, Ashton-Tate™, Novell® and many others — thanks to our alliances.

## To order or for more information, call.

And don't forget to ask about our complete line of printers, software, accessories and peripherals — and our special offer on Lotus Software!

Desktop Direct  
FROM  
Digital

**1-800-438-4311**

Please reference AXV when you call.  
Monday-Friday, 8:30 AM to 8:00 PM (ET)

**digital™**

Digital, the Digital logo, DECpc, DECdirect, Desktop Direct, DECnet, PATHWORKS and Vivace are trademarks of Digital Equipment Corporation. i386, i486 are registered trademarks of Intel and Intel is a trademark of Intel Corporation. Ashton-Tate™ is a trademark of Ashton-Tate Corporation. Dell is a registered trademark of Dell Corporation. COMPAQ is a registered trademark of Compaq Computer Corporation. Apple and Macintosh are registered trademarks of Apple Computer Inc. Banyan is a registered trademark of Banyan Systems. FAXit is a trademark of Alien Computing. IBM is a registered trademark of International Business Machines Corporation. CompuServe is a registered trademark of CompuServe Inc. Novell is a trademark of Novell, Inc. Microsoft and MS-DOS are registered trademarks and Windows is a trademark of Microsoft Corporation. Sun Workstation is a registered trademark of Sun Microsystems. Lotus is a registered trademark of Lotus Development Corporation.

## One more word about networking from the people who made it happen.

**PATHWORKS™**. What makes PATHWORKS the last word in networking? Choice, for one thing. Other networking operating system vendors say they offer "choice." They do — as long as it's theirs. But no one matches PATHWORKS' choice of servers, clients and even security. PATHWORKS works wherever and with almost whatever PCs, servers, network operating systems, local and wide area network applications you're using. PATHWORKS brings them *all* together — seamlessly. Making growth in an integrated environment

not just painless but *possible*.

PATHWORKS also works on a few other tough problems better than *they do* including:

- Security
- Network Management
- Access to Data at the Source
- Enabling True Peer-to-Peer Networking.

Our network service is just as flexible and distinctive. From installation of a single package to a single point of contact for a global multi-vendor environment. It's

just another advantage of dealing with a company that has 40,000 technical experts worldwide: DIGITAL.

**“ Ben & Jerry’s networks its PCs via DEC PATHWORKS.... We’re happy with our architecture. It meets our current needs and can expand to meet future ones. ”**

— *LAN Magazine*, March 1992



**NEW!**

### Point and go with Vivace™ for Windows.

Digital has a solution for anyone who has ever had to go searching through long forgotten sub-directories to find a missing file: Vivace.

Vivace lets you control desktop services, documents and folders via a graphical interface that puts the focus on how *you* work — instead of how the computer works. You can organize by task, by customer, by anything.

Vivace frees you from the tyranny of directories, subdirectories and sub-sub-directories. Just point your mouse and go — right to what you need.

To order Vivace, or for more information, call our Technical Consultants at 1 800 DIGITAL. Ask for our special limited time offer of 30% off list price!

List Price: \$145. **Now: \$102**

### Special notice to our Government customers.

For current prices, technical support and order placement for the new GSA-BC Schedule just call: 1 800 DIGITAL. Ask for the Government Contract Group and reference GSA Contract Number GS00K92AGS6158.

For networking products, pre-order information, call. Press option 2.

**1 800 DIGITAL**

Please reference AXV when you call Monday to Friday 8:30 AM to 8:00 PM (ET).

 **DECdirect™**



# Supporting It All

*Digital offers one-stop service to deal with complexities of multivendor PC sites*

**A** recent full-page cartoon in a national magazine showed two lab-coated MIS professionals scratching their heads, struggling to figure out what went wrong with their network of multivendor PCs. Two computer screens in the foreground are filled with arrows, each pointing at the other as if to say, "He did it!"

Finding the source of a problem across a multivendor PC installation often creates a problem as large as the one the network manager was hoping to solve. The complex mix of hardware, software and networking technologies, as well as of vendors, OEMs and service providers, can prolong downtime and leave a network manager confused. In situations like this, customers want a wide range of services and a single point of contact for problems that cut across platforms, vendors and technologies.

Paul Kelly, corporate business manager for desktop services at Digital Equipment Corp. in Stow, Mass., believes Digital can provide the one-stop-shopping service.

"What clients really want from a service provider is a company that has good technical skills in its own right, as well as contractual relationships with other

**As PC support manager at Boston's Children's Hospital, Kevin Hourican has his hands full. The hospital has more than 1,500 pieces of computing equipment under contract with Digital. "I really like Digital's ability to support everything," says Hourican.**

Copyright 1992 by Seth Resnick



major vendors through which it can track down and solve multivendor problems," Kelly said.

Digital is no stranger to the PC market, having provided PC integration services for more than 10 years. It is currently one of the fastest growing PC vendors in the industry, according to Computer Intelligence, a La Jolla, Calif.-based market research firm, and its PC Integration Services business has been growing at double-digit rates over the last two fiscal years.

At the same time, Digital has contractual relationships with many of the industry's largest PC software vendors, including Microsoft Corp., Banyan Systems Inc. and Novell Inc.

"If we look at the contract mix at most end-user sites, in terms of multivendor support, it becomes obvious that we have moved out of being a per-box supporter," Kelly said. "Any fault within the system is really a fault with the entire system and not an isolated problem."

Kelly said Digital has invested nearly \$30 million in multivendor testing and certification through its Customer Support Centers. For example, many of the centers maintain a wide mix of PC hardware, software and networking equipment so that when a user calls with a problem, Digital technicians certified for each of the different packages can simulate the user's network environment onsite in order to better diagnose the problem.

Nina Lytton, president of Open Systems Advisors Inc. in Boston, Mass., said she was essentially "pre-sold" on Digital's phone support for multivendor PC environments based in part on its ability to simulate her 10-node LAN environment at its Customer Support Centers.

## LAN Manager network

Open Systems Advisors has a mixed LAN Manager network of IBM-compatible PCs, including those from Dell Computer Corp., Compaq Computer Corp., Hewlett-Packard Co. and IBM. (Open Systems Advisors has no Digital PCs.) The server on the network is a System Pro running OS/2, while the

clients are IBM-compatible PCs running Microsoft Windows 3.1. The primary application on the network is an R-Base database with more than 15,000 names that serves as a single source for the entire company. The database is a mission-critical application for Open Systems Advisors — no database means no business.

"What we were really looking for was a single number we could call if we had any problems," Lytton said. "Digital has lots of its own experts who brainstorm among themselves and figure out the problems that are too complex for a small business like us to handle."

For example, the employees at Open Systems Advisors recently went into



**D**igital has its own experts who brainstorm among themselves and figure out the problems that are too complex for a small business like us to handle.

**Nina Lytton**

**OPEN SYSTEMS ADVISORS**

work only to find they had lost access to R-Base as a result of some unknown problem. The only thing the network manager knew was that the cover was off the server and a cleaning person had been in the office the night before. Open Systems Advisors called Digital's phone support and soon had a conference call involving three experts — one specializing in R-Base, one in OS/2 and one in LAN Manager.

By the end of the day, the team of experts determined that Open Systems Advisors would be best served by having the database restored from tape and had the company up and running by the next morning. In this case, the Digital experts saved the client from chasing leads that would prove unfruitful and held network downtime to a minimum.

"We used to get our support from different dealers, but we ran into knowledge and timeliness problems," Lytton said. "The database support people would say it was the network [vendor],

which would blame it on the hardware, etc. Digital gives us a single point of contact."

Much larger installations also find Digital's offer enticing. Boston's Children's Hospital has more than 1,500 pieces of computing equipment (PCs, printers and peripherals) under contract with Digital, including 700 IBM PCs, 100 clones and more than 200 Apple Computer Inc. Macintoshes. Most of the PCs are used as stand-alone boxes, while 120 are networked using Digital's Pathworks. Another 15 reside on a Novell NetWare network.

"The largest part of our service contract with Digital is for hardware support on our PCs, printers and peripherals,"

said Kevin Hourican, PC support manager at Children's Hospital. In addition, the hospital purchased applications and network support from Digital.

Prior to choosing Digital for its support needs, Children's Hospital contracted with IBM to cover its hardware, while Sears maintained the mix of Hewlett-Packard and Epson printers, and the hospital did its own application support. As the number of users grew, Children's Hospital found

it could not keep up with the application support without outside help. At the same time, it found that there were limits to the support being provided by IBM and Sears — IBM would not support the clone PCs, and Sears could not deal with the complex interaction of printers, networks and PCs.

"The best thing we found about Digital, besides being a single point of contact, was that they were very, very flexible and willing to customize their service," Hourican said. For example, Digital was willing to come to the site and install applications for end users and even helped to physically move equipment. At one point, an end user had a severe hard disk crash and Digital personnel went to the site, removed the hard disk, sent it to the manufacturer and reinstalled it.

"I really like Digital's ability to support everything," Hourican said. "That way we could give our end users a single phone number and leave it up to Digital to triage and fix the problems." ■

# Manufactured by DEC

**D**igital Equipment Corp. is capitalizing on its strengths as a worldwide manufacturing company in an attempt to become a leader in industry-standard, modular PCs that can be upgraded to a new CPU with a snap-in card.

In order to compete with smaller, fleet-footed companies, Digital has adopted a "franchise" manufacturing and distribution model that will allow PCs to be assembled and shipped from seven integration centers, while ensuring that the output of each center matches the quality of any other assembly point.

"When buying a PC, customers ask themselves, will this company be here to support me? Will it support me in multiple countries? Is the support and service consistent? Our business architecture and strategies address these concerns," said James Liu, Digital's new vice president of its Personal Computer Business Unit.

Under Liu's aegis, Digital recently set about manufacturing its own DECpc LP (Low Profile) line, which consists of six models. The systems, priced from \$899 to \$2,199, range from a 33-Mhz, 386-based system to a high-end 66-Mhz, 486dx2-based system.

The new PCs are based on a modular design with components manufactured at the company's facility in Taiwan for assembly at seven centers around the world — Springfield, Mass.; Kanata, Ontario; Tokyo, Japan; Taoyuan, Taiwan; Sydney, Australia; Sao Paulo, Brazil; and Ayr, Scotland. Previously, Digital had subcontracted PC manufacturing to Tandy Corp., Intel Corp. and Ing. C. Olivetti & Co.

"A lot of DEC customers were jumping ship. DEC will be able to pull those customers back into the fold because of the LP machines' specs and pricing. If DEC is able to get existing customers excited about this line, we think they'll do \$200 million in sales in 1992 and 1993," said Randal Guisto, senior analyst at Workgroup Technologies, a market research firm in Hampton, N.H. Digital officials estimate 1992 to 1993 PC revenues in the \$250 million range.

InfoCorp., a market research firm in



**The new PCs, including the high-end 66-Mhz 486dx2, are based on a modular design with components manufactured at the firm's Taiwan facility for assembly at seven centers worldwide.**

Santa Clara, Calif., reports that DEC sold 134,700 PCs through the first half of 1992, compared to 69,660 in all of 1991.

The new PC's modular design allows it to be customized by snapping in different components, 80 percent of which are common to all models. "This cuts down on inventory and price. We also cut costs by shipping the heavy components by ship and the lighter, high-value components such as mother boards and daughter boards by air," said Liu.

Digital is aiming to shave a few hundred dollars off the cost of making each PC it sells, he explained.

## The franchise model

Digital unveiled its franchise model with each manufacturing center following the same rules as it launched the LP line of PCs at the end of August.

"Large customers get the same models everywhere. These customers save on testing and training because application software works everywhere, network compatibility applies everywhere and upgrades are available everywhere," said Liu. Digital is one of the few companies large enough to build and sell PCs on an international franchise model, he claimed. The franchise model allows faster sales, service and support by providing centers closer to customers. The approach offers the strengths of both

large and small vendors, Liu added.

"This strategy looks more sustainable than the OEMing strategy they pursued earlier. Bob Palmer [Digital's new president] had said, to make money in PCs, you have to build them yourself," said Eric Clow, senior analyst at InfoCorp.

When Intel, Olivetti and Tandy were producing its PCs, Digital's marketing had been the strongest part of its PC strategy. "Now it is adding design and manufacturing. The missing manufacturing piece was a weakness," Clow noted.

"Overall, DEC will have to make up in volume for the lower prices it is offering," said Workgroup Technologies' Guisto. "DEC squeezes \$100 to \$200 out of each LP box and is hoping that will offset some of the volume they need. I don't think it will as much as they expect because DEC's new strategy will energize the competition."

The new LPs will be sold through Digital's Desktop Direct for PCs program. Launched last January, Desktop Direct allowed the company to tap into the \$27 billion PC market by establishing a direct channel for customers that combines 50 percent off Digital list prices, fast response, and full-line service and support. It has its own toll-free number (1-800-PC-BY-DEC), sales and marketing force, and catalog. Customers are promised 48-hour turnaround, optional next-day delivery, 100-percent qualified parts, a 30-day money-back guarantee and one year of free onsite service.

"DEC's PC business is growing fast, but they started at a real low base — so it doesn't take much to pump those numbers up. DEC's trying to attract the corporate user with the combination of reliability, service and support, which are positives for this sort of a buyer," said Steve Widen, senior analyst at Workgroup Technologies.

"But," he asked, "are they a little too late in the PC market to be able to garner a significant amount of market share?"

"DEC has a bigger presence in Fortune 100 accounts than the other PC vendors and everyone at these accounts knows DEC's reputation for service and support. DEC is in a good position to differentiate itself," said Guisto. ■

# Speaking with Vijay Thakur

*Vijay Thakur, director of the PC Integration Business Unit of Digital Equipment Corp. in Littleton, Mass., is the head of the Pathworks product line.*

## What is the future direction of your PC connectivity software?

"We want to do three things with Pathworks. We clearly want to use the Windows paradigm and make the entire installation management, configuration and operation intuitive. Installing something like this under VMS today requires you to have VMS knowledge and PC knowledge. That combination is scarce in the market and it's not going to get any better. So what we have to do is create a Windows-driven environment with a graphical, mouse-driven interface so you can pick-and-choose, click, and drag and draw, rather than know the VMS syntax. That's a priority. We want to drive to the point where the management environment is very intuitive and Windows-driven. The first phase will happen in early 1993.

"The second thing we want to do is create a single, integrated server environment for the three popular technologies, NetWare, LAN Manager and Macintosh. Right now you have three separate server environments. You can run them all on the same server at the same time, but they look like three different server environments. The Macintosh looks like a Macintosh because our original goal was to make the server environment look native to the client. That satisfies today's market. But tomorrow's market ... wants some consistent environment from which to manage that heterogeneous environment.

"At the same time they want NetWare clients, LAN Manager clients and Mac clients to access the same information simultaneously in a shared, record-lock manner. So our second objective with the next version of Pathworks would be to create a single, integrated server environment. You can buy any Pathworks client of your choice, but you need only one set of bits on the server. Depending on the client that you have chosen, the appropriate server would

be installed and the management environment would be a consistent, Windows-driven, one."

## You frequently mention "information integration." How are you moving toward that?

"It is necessary for us to create that robust underlying environment to allow the layered application services to be available for people transparently. We intend to add more value into Pathworks, which we believe will be a necessary prerequisite for all future information integration services.

"For example, system management of heterogeneous clients and servers. Or back-up services from any client to any server. Or basic database access engine API [application programming interface]. Virtually every application from now on is going to require a database. Even a system management application requires a database — you're going to track all these things and keep the information in a database. So you're going to have one common database engine and then that engine allows you to access any of the back-end databases — whether it is Informix or Sybase or Ingres or Oracle or Rdb from Digital or DB2 from IBM, or whatever — Pathworks will provide you with a path to any of them. We believe the next generation of Pathworks should have a database bundled into it. If you want access to any one of these databases, you would have it."

**Doesn't that start to change the role that Pathworks plays? Instead of connecting PC users to the net and leaving them there, you're attempting to bring the desktop user much closer to the data?**

"That's right. Pathworks is taking on the role of accommodating these popular technologies that become standard in the industry. We're actually building an integration environment on top of LAN Manager, NetWare and AppleShare for Macintosh. That's an advantage that we have because we're not tied to any one specific technology any more. We're trying to build an integration environment around the heterogeneity of technology that people are going to have." ■



Webb Chappell

**W**e're building an integration environment on top of LAN Manager, NetWare and Apple- Share for Macintosh. We're not tied to any one specific technology any more.

# Pathworks Extends Its Reach

In its five years of existence, Digital Equipment Corp.'s Pathworks has grown from a link between the humble PC and the host VAX into a client-server infrastructure, supporting a variety of key platforms, GUIs (graphical user interfaces) and network protocols.

Today Pathworks supports OS/2, Windows, the Apple Computer Inc. Macintosh and Unix along with the standard MS-DOS PC. Microsoft Corp.'s LAN Manager is part of Pathworks, which in turn interoperates with Apple's AppleShare and offers partial integration with the reigning local area network operating system, Novell Inc.'s NetWare. Pathworks supports Ethernet and DECnet, as might be expected of a Digital product, as well as TCP/IP, the X Window System and X.400 messaging. With support provided by Proteon Inc., Pathworks also works with token ring.

These capabilities are proving attractive to a growing number of managers who need a client-server architecture to link disparate platforms and environments that now characterize many computing environments. In the slow-to-grow minicomputer industry, Pathworks has become a star. With 1.5 million installed clients and a growth rate of 30 percent last year, Pathworks revenues are second only to the VMS operating system itself in DEC's software business. Within the foreseeable future, Pathworks revenues will overtake VMS, said Vijay Thakur, group manager of Digital's PC Integration Business Unit in Littleton, Mass.

Digital officials have plans for Pathworks that they believe will continue to enhance its appeal. Thakur sees the evolution of Pathworks as going through three stages. The first stage consisted of the use of LAN Manager to link MS-DOS and Windows PCs to the VAX. The second stage had Pathworks reaching out to a broader array of platforms, environments and protocols.

Thakur conceives of the third stage as "information integration." Pathworks is now moving beyond the limited capacity to supply connectivity and file and print services to a variety of desktop devices into a more fully functional, heterogeneous environment.

Such an environment would offer the

ability to access a document throughout the network, regardless of platform, environment or protocol. It could share voice, image and other multimedia services across desktop devices, offer enterprise-wide messaging and transaction processing and a host of other features.

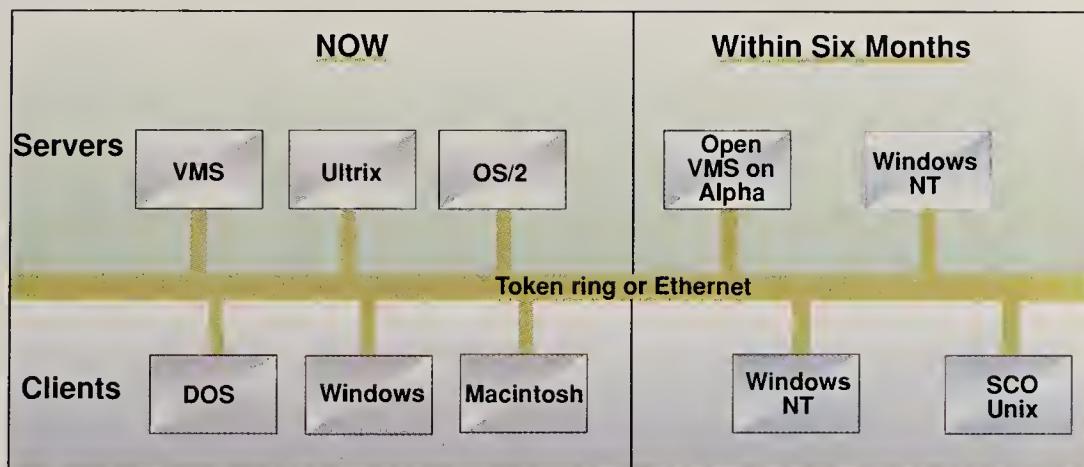
These functions – or some of them – indicate the future direction of Pathworks. In the short term, over the next six months, users can expect a series of announcements that extend Pathworks to new platforms while increasing the range of features and ease of managing the PC integration suite, Thakur said.

When Microsoft's Windows NT ships, DEC will support it within Pathworks on both the client and the server side.

the only technology out there doing an equally good job producing a GUI-driven management environment across all these technologies and platforms."

By late spring Digital intends to offer NetWare file and print services from either VMS or Ultrix Pathworks servers. Today Pathworks clients running the NetWare Coexistence option can select either a Pathworks or NetWare server. But they cannot obtain NetWare services from the Pathworks server.

Thakur said this move would be one step toward the goal of providing "a single integrated server environment." Today Pathworks servers are separate. Pathworks for Macintosh, for example, provides file service to Macs, and Pathworks



**Digital views PathWorks' next major phase as moving beyond integrating platforms, environments and protocols to "information integration."**

Thakur said such support could be expected within the next six months. The Santa Cruz Organization Inc.'s SCO Unix may be supported in the same time frame if users request it, said Katrina Hollman, marketing manager for the PC integration group.

Pathworks developers are working on a new management application that will enable a user of a Windows or Windows NT Pathworks client to manage the entire Pathworks network. Today Pathworks can only be managed from the server and the task requires a high degree of skill. Hollman said Digital plans to regularize management of all the environments so that a standard GUI becomes the interface to all current and future Pathworks-supported platforms and protocols.

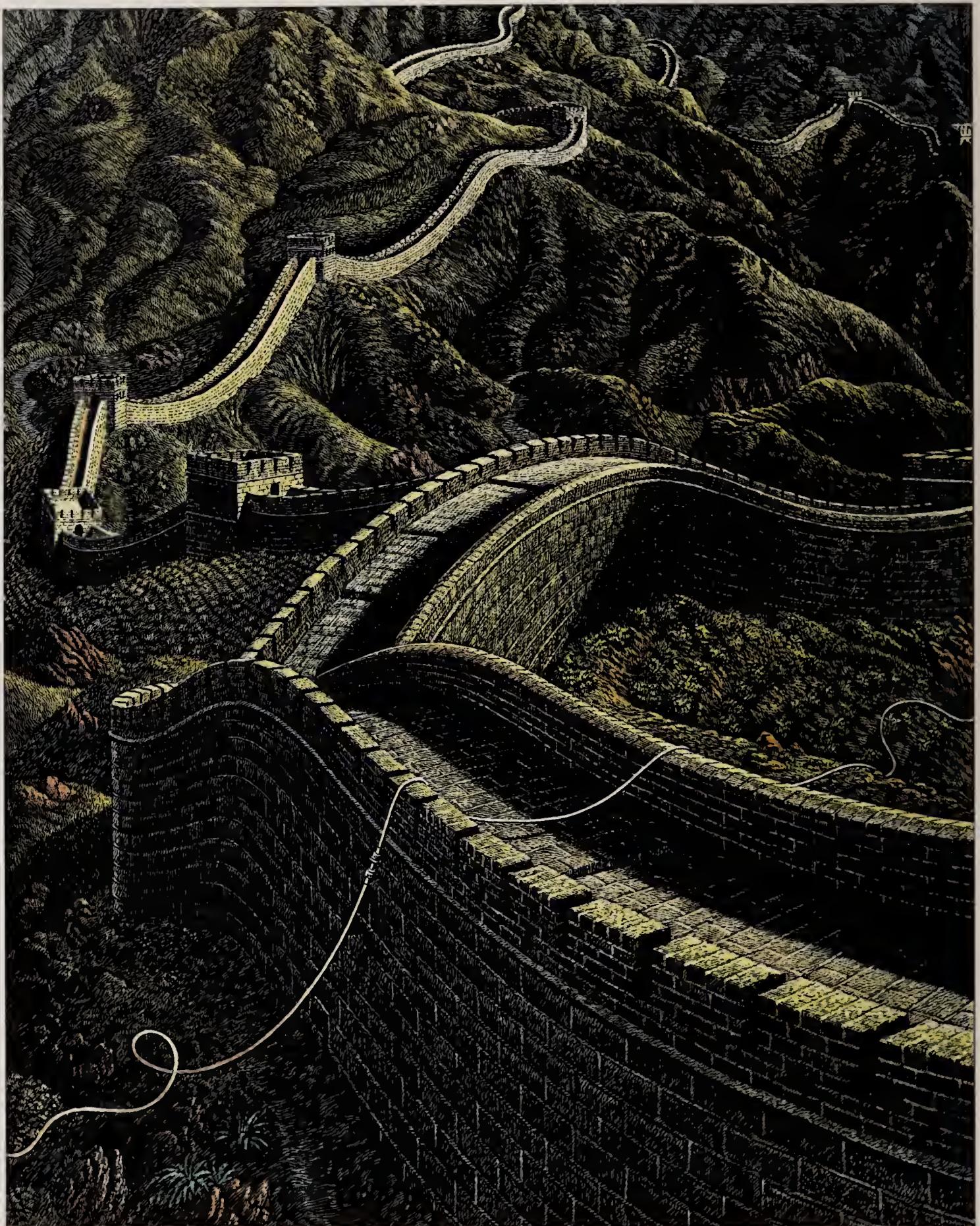
"You will see Novell doing a great job managing NetWare and Microsoft doing a great job managing NT," Thakur said. "But Pathworks is going to be perhaps

for DOS provides file services for DOS or Windows systems. Both server applications can run on the same VMS system. And while both save files in a VMS format, both provide interfaces to the client user that make it appear as if files are in their native formats.

"But if a Mac client using AppleShare and a DOS client using LAN Manager in a Pathworks environment want to access the same file today, they can only do it as a sequential access. They could not do a simultaneous read-write because we lack the necessary record locking and management," Thakur said. "In the longer term, our vision is to combine the ways of accessing the server into an integrated server environment."

For users turning to an open systems philosophy to avoid dependence on single vendors, Pathworks supports an array of standards and de facto standards. But there are still holes. Digital says, for

*Continued on page 26*



D I G I T A L . T H E

© DIGITAL EQUIPMENT CORPORATION, 1992. THE DIGITAL LOGO, PATHWORKS AND VMS ARE TRADEMARKS OF DIGITAL EQUIPMENT CORPORATION. MACINTOSH IS A REGISTERED

# BECAUSE PC LAN'S CAN'T TAKE YOU FAR ENOUGH, PATHWORKS GOES FURTHER FOR YOU.

One PC network is your passport to data anywhere in your company. Anywhere in the world.

It's the PATHWORKS™ PC Network. From Digital.

PATHWORKS is the PC network with the capabilities of a Wide Area Network built in. Which means data from across the world is as easy to access as data from across the hall.

But PATHWORKS isn't just your passport to data anywhere in the world. It's your interpreter, too.

With PATHWORKS doing the translation, information on DOS, OS/2, UNIX, Macintosh, and VMS™ systems will no longer be foreign to you.

And PATHWORKS doesn't fence you in. There are no limits on how far you can grow. And no

limits on how far-ranging a LAN empire you can manage from a single location.

So, want to go further than a PC LAN can take you?

Just call 1-800-DIGITAL, ext. 299. Or call your local Digital Authorized Distributor. And you'll discover why PATHWORKS goes much further for you.

**digital**™

**O P E N   A D V A N T A G E.**

TRADEMARK OF APPLE COMPUTER, INC. OS/2 IS A TRADEMARK OF INTERNATIONAL BUSINESS MACHINES. UNIX IS A REGISTERED TRADEMARK OF UNIX SYSTEM LABORATORIES, INC.

# Mainframe on The Desktop

*"You can run a whole company from one of these machines," says DEC's Gaubatz. The 64-bit Alpha workstations are due by year's end.*



**DEC's high-end Alpha workstation, code-named Flamingo, is a single-processor machine that features six 100-Mbit/sec. TurboChannel slots.**

**D**igital Equipment Corp. recently offered a sneak preview of its upcoming Alpha workstations, code-named Sandpiper and Flamingo, featuring three and six 100-Mbit/sec. TurboChannel slots, respectively. Digital touts the high-end Flamingo as a "desktop mainframe."

Flamingo will likely be priced at less than \$50,000, and Sandpiper, the midrange model, will likely be less than \$20,000. Both are single-processor machines and will be part of a complete line of Alpha workstations to be announced by the end of the year.

"Flamingo is the highest end traditional workstation we're addressing right now. I would position the Sandpiper in the midrange. That leaves room for other things to happen at the low end," said Don Gaubatz, vice president of Dig-

ital's Workstations and Servers Group in Maynard, Mass.

"We do have low-end machines actually running at this time on at least two operating systems. You're looking at what I call a full product line very early in the launch of the Alpha workstation family," said Gaubatz.

The Alpha workstations are a continuation of the existing DECstation line, according to Gaubatz. Common to both lines is the TurboChannel system bus. The machines also have the same two-dimensional and three-dimensional graphics, multimedia, communications, storage, and VME and real-time interfaces. The primary difference between the DECstations and the Alpha workstations is the 64-bit CPU.

"People tend to overlook the fact that going from a 32-bit machine to a 64-bit machine is a major accomplishment.

You can run a machine at 32 bits and achieve reasonable SPECmarks," said Gaubatz. "To get the same SPECmarks while you're actually running a machine twice as big [64 bits] says you have an unprecedented amount of 'headroom.' These platforms will have the headroom to be able to evolve large applications through the 1990s."

An example of a large application is ECAD (electrical computer-aided design) used in microprocessor engineering. Chip design can be done on a 32-bit system, but it becomes increasingly more difficult because you run out of headroom and start bumping your elbows against the sides of the box, said Gaubatz. From the chip designer's perspective, the actual microprocessor is, in some cases, as much a reflection of the design environment as of the physical entity, he said.

Other "large" applications include MCAD (mechanical computer-aided design). For example, the Flamingo could produce an image of an engine block and a piston and enable users to fit the piston into the cylinder block, checking clearances. The approach allows the designer to model how the pieces will work together and adjust the clearances during the design stage, rather than in early manufacturing.

The systems promise a much higher level of simulation using more complex data sets and more data, Gaubatz added.

### Applications are in demand

In architectural applications, the machines provide the capability to show a prospective buyer of a 90-story building how it will look inside and out, exactly as it would be when occupied. "This is one of those situations where the least sophisticated customer or user will place the largest demands on the system. Such applications are in demand as soon as they are implementable," Gaubatz said.

Applications such as these put existing computer systems at their limits. "When we say to the industry we're going to 64 bits and some people say we don't need it — that's not true. These systems not only have the power to do these kinds of applications, but also the room to grow beyond them," said Gaubatz.

Currently, Digital is working on running benchmarks for the Flamingo and Sandpiper, which the company says are so powerful that they have the ability to contribute as database servers and application servers. "We've doubled the word size and the capacity. For those applications in which the data spills over and becomes twice as big, the systems are not going to slow down. That's what we mean by headroom. The Flamingo is literally a desktop mainframe. This machine is more computing than most companies have in their whole place. You can run a whole company from one of these machines," said Gaubatz.

The Alpha CPU itself features 8 KBytes of internal cache for data and 8 KBytes for instructions. Secondary cache consists of 512 KBytes with a high-speed, 256-KByte data bus tying the secondary cache to main memory. "We have doubled the [word] width for the fetch. We can fetch 32 bytes in one cycle, so 256 bits comes flying into cache in about 200 nanoseconds. The memory and cache have been optimized for the Alpha chip," said Bill Jackson, marketing manager for Alpha workstations in Maynard, Mass.

The 100-Mbit/sec. TurboChannel slots

# Snap-in CPU Upgrades Keep DECstation Family Current

Although Alpha chips are at the heart of still-to-be-announced DEC workstations, the company has not forgotten the microprocessor architecture that powered its earlier entrants into the RISC market.

Customers who invested in Ultrix-based DECstations that use the MIPS R3000 family of chips will soon be able to move to the next generation of MIPS processors by simply snapping new "daughter cards" onto the mother boards of their workstations.

DECstation Product Manager Tracy Richardson emphasized the ease of these customer-installable upgrades to the R4000 chip, which he said will deliver a performance increase doubling or tripling the power of Digital's current R3000A-based workstations.

In addition to installing the new daughter card, users will also have to install a revision of Ultrix that supports the R4000 chip, said Richardson.

The R4000 is a 64-bit chip, but the Digital implementation will be 32 bits. Digital plans to use the fastest chips available in volume on the daughter cards, according to Richardson. The first available upgrades will use an R4000 running at 50 Mhz.

Even in a 32-bit implementation, the R4000 contains design features that take it beyond the R3000 in performance. Industry chip guru Michael Slater wrote in his October 1991 "Microprocessor Report Newsletter" that the superpipelined R4000 is "the first of a new generation of microprocessors that will reshape computer systems over the next few years."

Slater said that although the R4000's average of 2 to 2.5 clocks/instruction is roughly twice that of the R3000's 1.25 clocks/instruction, the performance gain comes from the fact that the deeper pipeline makes a higher clock rate possible. According to Slater, the R4000 appears from an external view to fetch, decode, dispatch and execute two instructions per cycle at 50 Mhz, but when viewed internally, it is apparent that the processor runs at 100 Mhz with a pipeline executing one instruction per cycle.

Slater added that although the R3000 peaked at 40 Mhz, the R4000 is starting out with a pipeline clock of 100 Mhz.



**The MIPS R4000 64-bit chip is designed to serve as the basis for two and possibly three generations of processors.**

He said the R4000 is designed to serve as the basis for two and possibly three generations of processors: One next-generation version will feature a smaller die size and lower power dissipation, and another will have twice as much cache, 32 KBytes, and will be designed to operate at 150 Mhz internally. Another version in 1993 will have a 64-KByte cache using 0.5-micron and denser processes, and operate at a 200-Mhz internal clock rate.

DEC's Richardson said the upgrades will be offered for all current DECstations: the Personal DECstation 5000 Models 20, 25, and 33 and the DECstation 5000 Models 133 and 240. Two form factors for the daughter cards exist. One measuring 3 x 5 inches will be used in all of the models except the 240, which will require a 5- x 8-inch daughter card. (The older DECstation 5000 Model 200 can also be upgraded to the R4000, but will require a new mother board that is not customer-installable.) The list price for the upgrades will be \$3,000 for Personal

*Continued on page 26*

on Sandpiper and Flamingo are compatible with existing two- and three-dimensional graphics boards, communications options such as FDDI (Fiber Distributed Data Interface), and storage options from DEC and third-party vendors. Sandpiper offers three Turbochannel slots, the same as the existing top-of-the line DECstation 5000 Model 240. Flamingo ups the ante to six Turbochannel slots.

The systems will feature standard Ethernet and physical interconnects, including ThinWire and 10Base-T. Users will be able to network the systems immediately.

The systems also feature embedded

I/O, including one internal and one external SCSI interface that work concurrently. Also featured will be built-in audio and two-dimensional graphics.

"I see these systems becoming the multimedia development platforms of choice. For example, you can put DEC-spin [Digital's video teleconferencing product] in one slot, FDDI in the second slot and another SCSI controller for even more disk in the third slot," said Gaubatz.

"You could have very much greater than 120 GBytes of data, so you could have huge databases. You could put ATM [asynchronous transfer mode] in a slot, you could put a token ring and you

could put in a TurboChannel-to-VME interface," he added.

Analysts expect the Alpha workstations to deliver 100 SPECmarks (more than double the performance of a VAX 9000 Model 210).

Some analysts say Flamingo will operate at 80 to 120 SPECmarks with 512 MBytes of memory. In comparison, The DECstation 5000 Model 240 rates 32.4 SPECmarks and has a maximum memory of 480 MBytes.

Flamingo will offer graphics capability of 1.2 million three-dimensional vectors/sec. and 270,000 Z-buffered triangles/sec., according to company docu-

*Continued on page 26*

## Opening PC Windows in a Workstation World

Even though workstations have been made easier to use with graphical interfaces such as DECwindows, for some users there's just nothing like comfortable MS-DOS and their favorite PC applications.

DOS aficionados who have Digital Equipment Corp. workstations can get the best of both worlds without squeezing a second machine onto their desktops. Rather, a software product called DEC SoftPC provides a complete DOS environment, including access to users' existing DOS files and applications.

DEC SoftPC is available in a \$595-pre-user version for both VMS VAX-stations and a \$725 version for RISC/Ultrix DECstations. It enables users to retrieve and share data among the different operating system environments. Users of VT220 terminals or X terminals connected to workstations that run SoftPC can also use the DOS emulation environment.

Although the software provides emulation of a PC AT-class machine (based on Intel Corp.'s 80286 plus a 80287 numeric coprocessor), performance is actually better because the application is running on a more powerful workstation. According to Digital's testing, DOS applications can run anywhere from one-and-a-half times as fast as a PC AT on the VAXstation 4000 VLC to more than three times as fast on a VAXstation 4000 Model 60 or a DECstation 5000 Model 200. At the top is the VAXstation 4000 Model 90, seven times as fast as a PC AT.

The latest release of DEC SoftPC, version 3.0, adds several features to



**DEC SoftPC provides a complete DOS environment for users of Digital workstations.**

the basic package that runs MS-DOS 3.0. Resizable windows are now available. Video emulation includes VGA (Video Graphic Array), EGA, CGA and Hercules, as well as MDA on the VT220. In addition, a native MS-Windows driver provides higher performance with Windows-based applications. As before, multiple DEC SoftPC windows can be opened simultaneously.

Users can set up two hard disks of up to 32 MBytes each, designated C and D. LIM 4.0 expanded memory, up to 32 MBytes, is supported.

DOS files and applications on 3.5-

inch or 5.25-inch diskettes can be accessed at the workstation if it has a local floppy drive. If there is no local floppy disk, SoftPC can attach to a PC and use its floppy drive in a feature called SlavePC.

If the workstation or X terminal running DEC SoftPC has a mouse attached, it can emulate a Microsoft bus mouse in the DOS environment.

Communications ports, COM1 and COM2, map to the serial ports of the system running DEC SoftPC. Printer connections, LPT1 and LPT2, map to the serial ports or to a spooled device. Digital support literature warns that communications software should be tested before purchasing because of the differences in signaling on the PC and the VAX or RISC processors and differences in the way those processors handle interrupts compared with a PC chip. However, according to the company, many communications programs do work correctly.

By the same token, Digital has tested hundreds of PC applications but does not guarantee that all of the tens of thousands of available DOS applications will run.

DEC SoftPC for Ultrix requires 8 MBytes of main memory to operate in conjunction with Ultrix Workstation software. Running in a VMS environment, DEC SoftPC alone requires 2 MBytes of main memory; when running in conjunction with DECwindows it needs 6 MBytes. Digital recommends, however, using it with more memory to improve performance. Disk space requirements are 7.5 MBytes in Ultrix and 15.2 MBytes in VMS. ■

# DEC's Spin on Multimedia

Even though they are working in different locations and in some cases, different states, a group of Digital Equipment Corp. software engineers see each other every day – without ever leaving their offices.

Networking engineers in Littleton, Mass., software developers in Nashua, N.H., and their boss, Don Gaubatz, vice president of workstations in Maynard, Mass., consult by talking to video cameras while sharing screens of text and diagram specifications. The interactive, live consultations are made possible by a little-known application, DECspin teleconferencing software.

Two FDDI (Fiber Distributed Data Interface) networks loop 54 miles between the Nashua and Littleton plants and between the Littleton and Maynard facilities, with 10 DECstation 5000s providing the data transmission power, explained Jack Toto, multimedia marketing manager at Digital.

"The primary benefit I get from having DECspin on my desk is I can use it without thinking about it," said Gaubatz, who is used to talking to a TV camera mounted on his workstation. "I can play with DECspin in a very user-oriented way and then feed my reaction to the developers through the DECspin user interface."

Previously, Gaubatz communicated with his project workers by telephone. "When we communicate over DECspin, our conversations are usually shorter. I think that's because when we talk face to face, the human communication bandwidth is much higher," he said. "I get the advantage of seeing the functionality of DECspin right on my desk and the advantage of talking to the other sites without spending the time traveling to them."

DECspin, a multimedia application created by Digital to speed software development, is being used in the development of DEC multimedia software. "We use it in-house as an engineering tool as well as to facilitate meetings," said Toto.

Gaubatz can dial up engineers, ask questions and share and modify engineering drawings if necessary without having to drive 45 minutes each way between facilities. "In this economic climate, you can't have key personnel wast-



Webb Chappell

**Sitting at a DECstation 5000, Digital's Don Gaubatz uses DECspin teleconferencing software to consult with engineers and developers at distant DEC offices.**

ing that kind of time away from the development process," he said.

DECspin is currently available only for DECstation 5000s. Toto said that Digital is looking toward providing future versions for other platforms, including Sun Microsystems Inc. and Hewlett-Packard Co.

DECspin is designed to work with several pieces of multimedia hardware, which are included in the price of the run-time license. The hardware consists of a DEC video card, a frame buffer card, an audio card and a distribution box. The audio card is built into the Personal DECstation 5000 Models 20 and 25. DECspin loads on each machine participating in the teleconference, transmitting live video and audio among them.

The video originates from cameras mounted on the workstations. The telephone handset or headset plugs into the distribution box, which plugs into the workstation.

Digital is developing a compression board based on industry standard JPEG (Joint Photographic Experts Group). The compressor will enable images to be captured, compressed, sent over the network and decompressed at their destinations. In tests, the JPEG board used with the DEC NS 600 hardware router over T1 lines from Chicago to Boston transmitted 11 to 15 frames per second as opposed to about two frames per second without compression, Toto said. The frame buffer card and the video card will be included in the JPEG board. ■

## WORKSTATIONS *from page 24*

ments. In comparison, the DECstation 5000/240 offers 445,000 2D vectors/sec. and 436,000 3D vectors/sec.

Sandpiper is suited for two-dimensional simulation and mapping, CASE and logic simulation, the documents indicated.

Gaubatz said the SPECmark ratings for Sandpiper and Flamingo have not been finalized. "We have our compilers maturing on a very frequent basis. Once you get the hardware in place, once you figure out the feeds and speeds – then you continually evolve the compilers.

"The compilers right now are in a very fast state of evolution and they literally improve the preliminary SPECmarks of these things every week. So we can't say what the SPECmarks will be by the time the machines come out," he said. ■

## It's All in the Chip

The 64-bit Alpha CPU rates 150 SPECmarks. Known as the 21064, the chip's maximum clock rate is 150 MHz and its peak MIPS rating is 300. Currently, the R4000 chip from MIPS Technologies Inc. is the only 64-bit chip on the market. It has a maximum clock rate of 50 MHz, a peak 100 MIPS and 70 SPECmarks.

At 100 MHz, a peak 200 MIPS and 120 SPECmarks, Hewlett-Packard Co.'s Precision Architecture RISC 7100 comes closest to Alpha performance – but is a 32-bit chip.

The former MIPS Computer Systems Inc., which recently merged with Silicon Graphics Inc. and is now known as MIPS Technologies Inc., said it will take the R4000 to 150 MHz by the end of 1992 and has targeted 200 MHz for the second half of 1993. The Alpha chip differs from the R4000 because it incorporates 15 VUP (VAX units of performance) instructions, including VAX floating point.

## Pathworks

*Continued from page 19*

example, that its support for the Banyan Vines network operating system is "coexistence only" right now. And it has still to make a firm commitment to SCO Unix support.

Digital claims to have a unique breadth of support planned for Pathworks' future. But even product managers within Digital concede that users will continue to be the judge of whether existing support or future support in Pathworks meets their needs for PC integration. ■

# R4000 Snap-in Upgrades

*Continued from page 23*

DECstations and DECstation 5000 Model 133; the upgrade for the Model 240 will cost \$4,000.

The Personal DECstation family, which currently ranges from \$3,995 to \$6,995 in entry-level, diskless configurations, features a main memory capacity of 40 MBytes. Onboard audio and the availability of live video input options make these systems capable of running multimedia applications. The systems have two TurboChannel bus slots, integral SCSI one RS-232 synchronous/asynchronous port, and, like the rest of the current DECstation models, onboard 802.3 Ethernet as well as optional multiple FDDI and multiple 802.3 Ethernet.

The DECstation 5000 Models 133 and 240 have main memory capacities of 128 MBytes and 480 MBytes, respectively. They feature three TurboChannel slots, integral SCSI and two RS-232 synchronous/asynchronous ports. In entry-level, monochrome diskless configurations, the Model 133 is priced from \$8,495, and the Model 240 is priced from \$11,995.

According to Richardson, key to the upgrade strategy is the fact that virtually all current DECstation hardware, such as graphics options and storage peripherals, will work seamlessly with the new architecture.

The RISC workstation family was the first set of Digital systems to use the 100-Mbit/sec. TurboChannel bus interface, which is also the peripheral interface for future Alpha systems. DEC has promoted TurboChannel as an open interface and encouraged the development of third-party peripherals through its Tri/Add program.

Among third-party Turbochannel options listed in a recent Tri/Add catalog are network adapter cards, data-acquisition interfaces, serial and parallel line interfaces, IPI (Intelligent Peripheral Interface) disk drive controllers and real-time video interfaces.

Turbochannel-to-VME bus interfaces enable customers to use industry-standard VME peripherals with their DECstations as well.

Also, DECstation support for standard SCSI peripherals ensures that a wide variety of inexpensive storage devices can be used with the workstations.

The entire line of Digital's Tur-

boChannel-based graphics options will go forward with R4000-based systems. At the low end of the graphics line are the MX options, a single-plane, high-resolution (1,280 x 1,024 pixels) monochrome frame buffer that takes up one TurboChannel slot. The TX graphics option was designed for use in conjunction with the DECvideo multimedia options and provides a socket for the live-video daughter card. This high-resolution option contains a 24-bit true color frame buffer and an independent 8-bit color-mapped frame buffer; it takes up one TurboChannel slot.

Another one-slot graphics option is the HX, which has 8-bit planes with 1,280- x 1,024-pixel resolution. Unique to the HX is a Smart Frame Buffer custom chip that provides acceleration for two-dimensional line drawing, stippled

---

**A** key to the upgrade strategy is the fact that virtually all current DECstation hardware will work seamlessly with the new architecture.

---

polygon filling, pixel copy and Boolean operations.

Offering a higher level of graphics performance are the PXG, PXG+ and PXG Turbo+. All implement an advanced graphics acceleration architecture, but with differences in form factor and performance. The PXG and PXG+ occupy two TurboChannel slots, while the Turbo+ is a triple-width card. At the top of the line, the Turbo+ has 24 image planes, a 24-plane double buffer, 24-plane Z-buffer and 24-plane buffer for offscreen storage of pixmaps.

One uncertainty that remains in the DECstation upgrade strategy is whether future hardware options will be compatible with the R4000-based workstations. A Digital spokesman said that although all TurboChannel options will physically fit into the older systems, it will be up to the options designers to write the appropriate drivers for the DECstations. ■

# It's Not a File Server

**O**ne way to begin a description of Digital Equipment Corp.'s InfoServer network storage device is to say what it is not — it is not a file server.

"The InfoServer is a unique device that offers the opportunity for LAN users to share SCSI devices," said Mike Lynch, InfoServer marketing manager at Digital. "The benefit to Macintosh, PC, VMS and Ultrix clients across a LAN is that now they have at their disposal up to 14 SCSI devices they did not have to go out and buy."

According to Lynch, the differences between InfoServer and generic file servers are basic. The InfoServer, which is based on the MicroVAX 3100 processor, offers virtual disk and tape services to clients in multiple environments and is optimized for handling multiple reads and seldom writes. In contrast, file servers offer clients a variety of file-based services, including the opportunity to

*DEC's InfoServer offers virtual disk and tape services to clients in multiple environments.*

share files transparently but only across a bounded LAN environment. In their favor, file servers deal equally well with multiple writes and multiple reads.

Underlying the services provided by InfoServer is Digital's LASTport (Local Area Storage Transport) protocol. LASTport is a protocol developed by Digital that optimizes the efficiency of

read functions and ensures the heterogeneity of the InfoServer by transferring data at the block level.

LASTport was built using an asymmetrical client-server model that contrasts sharply with DECnet's peer-to-peer model. The asymmetrical client-server model allows LASTport to speed interactions between clients and the server across a LAN by handling up to 255 simultaneous transactions and eliminating the need for clients to send acknowledge messages back to the server.

System managers can hang up to 14 different SCSI devices off the InfoServer, including CD-ROM drives, hard drives and tape drives. The InfoServer 150 ships with an internal 120-MByte RZ23L hard disk and an RRD-42 CD-ROM drive already installed on one of its two 7-port SCSI buses, leaving a total of 12 SCSI ports open.

To users, the InfoServer simply looks like another SCSI device, another area

*Continued on page 32*



Peter Ensenberger/Black Star

**Bill Delhan, coordinator of computer services at Mesa Community College in Arizona, uses two InfoServers [above] to provide virtual disk services to 12 diskless, 386-based DOS workstations scattered around the college's library. Behind Delhan is systems technician Carl Nelson.**



# Speaking with Larry Cabrinety

*Larry Cabrinety is vice president of the Video, Image and Print Systems Group for Digital Equipment Corp. in Westford, Mass. The group is responsible for producing Digital's printers, DECprint Architecture, imaging systems, and X Window and other terminals.*

**How do you characterize the change in your unit as you observed the movement toward end user computing?**

"We decided three years ago to stop just addressing the Digital base of customers. We decided that we had to start offering the customer the lowest-cost solution that gets the job done. There was to be no more of this, because we're a workstation vendor, we want to sell you a workstation. We want to supply text terminals that can put up PC Windows when hooked to a 386 or 486 machine. That's a \$500 seat. Most companies have not done that."

"The desktop was the fastest-growing area of computing, and we said to each other, 'Hey, guys, let's try to do it right.' It was part of the restructuring here."

**What's an example of your investing in this approach?**

"Every network needs a good shared printer. Nobody can print on a network the way we can. We have invested \$15 million in software for our DECprint Architecture to print anywhere on the network. We have the ability to queue up jobs (with non-sequential priority). We can reroute the job to another printer. We have patented the ability to do end-up image, or printing multiple images on one piece of paper. If you received 10 memos during the day, you can order them printed out on one sheet to take home and read. We can reroute the job to another printer. We can deliver bar codes anywhere on the network and print them out."

"DECprint provides a two-way communication capability. We printed out a technical manual in Cannes, France, from Westford, Mass., and we knew when the printer in Cannes was out of paper or jammed up. We have the power on the network to do these things."

"The DECimage part of the architecture allows you to print scanner-style images at printer speed. We can produce resolutions of 1,000 by 1,000 dots per inch off an image produced from a 300- by 300-dot-per-inch engine. It makes

the lines much crisper. We call it image enhancement."

"And the MIS manager has full systems control of that printer. He knows when it's out of toner or paper. He can take full control of that printer and get the job done."

**But is this in the Digital environment only?**

"DECprint can drive about half of the PostScript laser printers out there. It takes some fine tuning to get it to run on third-party printers — not a lot. But we can't support all printers, just the big runners [established, high-volume printers]. By the first quarter of 1993, we will have DECprint playing on Hewlett-Packard printers. (But Digital has not set pricing.) IBM's RS6000 and System V machines will be able to run printers using DECprint by first quarter 1993."

"We are also aiming to have PCs on Novell NetWare able to make use of DECprint printer services."

"SunQuest Information Systems of Tucson, Ariz., resells our DECprint software on Sun machines."

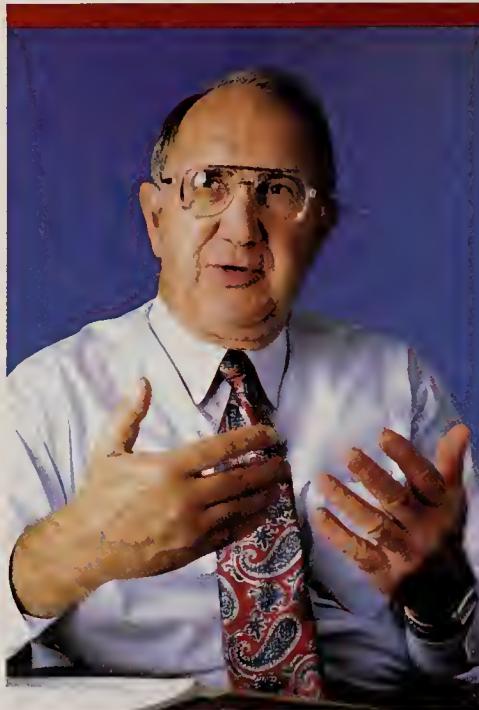
**Digital used to sell a half-million dumb terminals a year. Isn't that business declining and what do you see coming onto the desktop in its place?**

"There are six million dumb terminals sold worldwide [per] year now, and Digital sells 600,000 of them. We're expanding into the private label, OEM market. Three years ago we decided to go after the worldwide base of computing."

"Digital used to produce ANSI character-cell and graphics terminals. That was it. Now we will do [IBM] 3270, Tektronix 4270 or whatever you want. We have VT420 PCTerm that can be run off a multiuser Intel PC for MS-DOS or SCO Unix applications. We'll make a terminal do whatever you want it to do."

"The terminal market is still evolving. The world of the X Window System will take it to a new dimension. X will make the terminal market start to grow again. We plan to run X Window terminals on token ring next spring. We'll have an InfoServer on token ring feeding X Window terminals. Not everybody wants to buy a PC for every worker."

"The world is changing rapidly. Some workstation vendors disavow that an X terminal can be tied to a workstation but it's going to happen. It lowers the cost per seat." ■



Webb Chappell

**W**e decided three years ago to stop just addressing the Digital base of customers. We had to start offering the customer the lowest-cost solution that gets the job done.

# DEC Printers Talk Back

**A** Digital Equipment Corp. engineer in Westford, Mass., delivered a technical document to a colleague the next day in Cannes, France. Instead of trying to catch the Federal Express pickup, she sent an electronic file of the document over DEC's internal network to France, ordering a printer there to output it.

When the printer ran out of paper, she was informed of the interruption by sensors on the machine and she was able to leave an E-mail message for her French counterpart to reload the paper tray in the morning. Once the reload occurred, the printer continued to give priority to the technical document and picked up printing it from the point where the paper had run out. Before his co-workers had shown up for work, the French employee had his document in time for the day's demonstrations.

Examples like this are the result of DEC's \$15-million effort to develop DECprint Architecture, a set of networked software products to maximize printer services, according to Larry Cabrinety, vice president of the Video, Image and Print Systems Group in Westford, Mass.

"Printers had to learn to talk back. They had to tell the user about their status, whether they were low on paper or other consumables, whether they received a job, when they finished a job and other things that allow remote printing to be as efficient as local printing," said Allan McDonald, DECprint marketing manager.

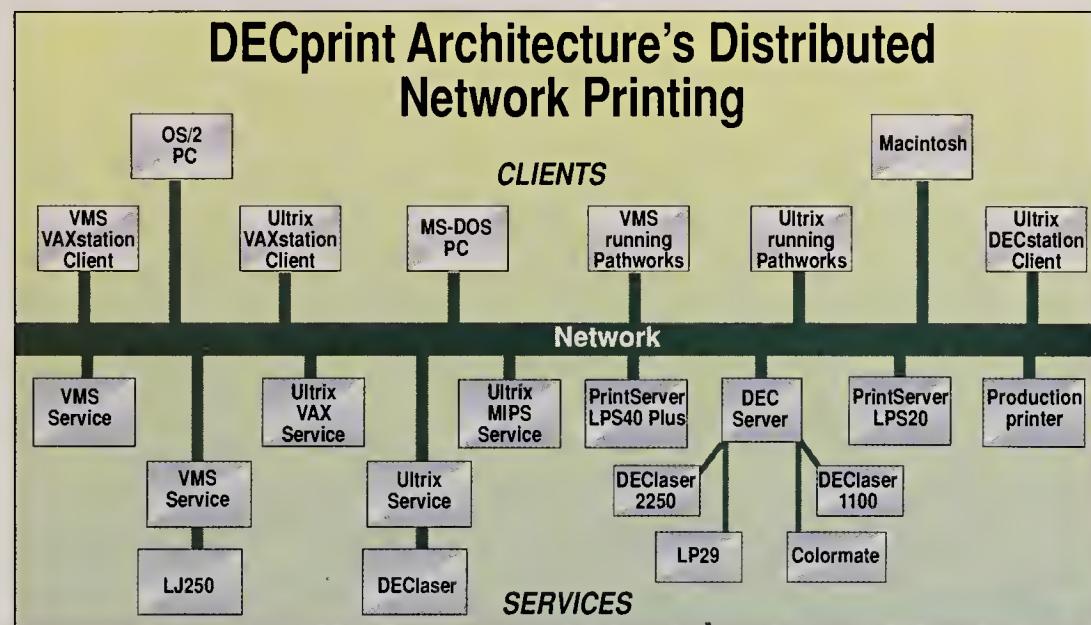
Most printer usage on a network is marked by one-way communication, agreed Angele Boyd, director of print research at the International Data Corp., a market research firm based in Framingham, Mass. "DEC offers more two-way communication than is typical in other environments. DEC will give the user little cheat sheets - codes that can be used to order two-up printing [multiple pages or images on one sheet] and other special processes, she said. If the printer to which a task is sent is not available, DECprint functions will reroute it to another printer on the network and let the user know, Boyd said.

DEC relies on standard PostScript language within DECprint and is designed to work with Digital-produced printers, and some third-party products that support PostScript. Many PostScript printers are not equipped with the sensors and communication facilities needed to supply DECprint services, noted Boyd.

Under the DECprint Architecture, Digital has released a number of products that allow users on DECnet, TCP/IP or Pathworks (Digital's PC and LAN connectivity package) to maintain two-way interaction with a networked PostScript printer. DECprint Printing Services, for example, provides network

Clients offer a standard user interface, job assembly functions and a job manager. DECprint Service packages offer job scheduler and print supervisor functions.

DECprint Service software is currently available only for VMS hosts. Digital plans to migrate the services to Ultrix and other Unix platforms, McDonald said. The current batch of DECprint software ships with all Digital PostScript printers (such as the PrintServer family of network laser printers) and is available for use with PostScript printers from other vendors. DECprint software packages for third-party PostScript printers



**DEC has released a number of software products that allow users on DECnet, TCP/IP or Pathworks to maintain two-way interaction with networked PostScript printers.**

services and printer feedback to users in DEC's VMS environment.

"Talking back was always part of VMS systems services," noted Mike Maynard, president of Integrated Management Resources Inc. (IMR), a market research and consulting firm in Stow, Mass. "Now it is more standard and more graphical in nature. Also, under DECprint, the printer talks back to you at a finer level of granularity."

Part of the architecture outlines standards for applications that create documents, clients that accept print requests from applications, and the printers and services that execute a print request.

These standard functions are generally implemented in DECprint Client or DECprint Service software. DECprint

are loaded directly onto the printers and are licensed separately.

An example of the extended flexibility of the DECprint Architecture is its handling of DECfonts, a separately licenseable part of DECprint. Users who have DECfonts do not need to have all fonts resident on all printers. With DECfonts, the fonts are distributed with the document so that any PostScript printer can print any DECfonts document.

"DECprint products take advantage of the richness of the PostScript language to increase the efficient use of the shared printing resource," McDonald said. Nevertheless, selling DECprint requires convincing a customer that printers are a

*Continued on page 32*

# Dumb Terminals Remain Preferred Device of Many

As Digital's VT dumb terminals move into the future, they are taking on a more intelligent look, offering split-screen capability and looking towards windows functionality, while maintaining the rock-bottom prices customers have come to expect.

"Eighty-five percent of people use computers for word processing and mail only, so these terminals are not going to go away," said Larry Cabrinety, vice president of Digital Equipment Corp.'s Video, Image and Print Systems Group in Westford, Mass. "Now we are getting to the point where it's easier to put more into the terminals than to lower the price of the terminals as they are now."

Besides windowing capability, future terminals are likely to add such features as clocks, calculators and mice. Many are moving from a character base to a simple dot-matrix base, which would facilitate bit-mapped graphics and possibly color. Digital currently is watching to see if a market will develop for these features and functions, said David Cotton, text terminal business manager. "Color tubes cost more and we need to maintain a two-to-one price advantage over PCs with color. We do get requests for color on these terminals, but at this point it is a niche market," he added.

Currently DEC's line of traditional terminals includes the VT420 (which replaces all earlier models), the VT420 PCTerm, the VT330+ and the VT340+. The VT340+ is Digital's only color terminal. All models will run the thousands of available ASCII and ANSI application packages and do simple line drawings, graphics and spreadsheets. The PCTerm models can run monochrome PC applications as well. Digital is working with the MDOS (Multiuser DOS) Federation to establish a standard for PC terminals.

The VT420 PCTerm is a text termi-

nal adapted for SCO (Santa Cruz Operation) Unix and MDOS PCs, as well as a desktop system for accessing PC applications running on multiuser Intel Corp.-based PCs and Unix systems. It uses a PC keyboard to access applications running on SCO Unix and SCO Xenix operating systems and MDOS systems. It provides the functionality of Digital's standard VT420 terminal, including single- or dual-session operation with full- or split-screen viewing and text windowing. Both the VT420 and the VT420 PCTerm are priced at about \$629. The VT330+ and VT340+ offer dual sessions, graphics



**DEC's line of terminals includes the VT340+ with a 16-inch color monitor.**

and split-screen capability. The VT340+ offers a 16-inch color monitor. The terminals are priced at about \$1,885 and \$2,725 respectively.

DEC's terminals are now becoming international in scope with support for a number of foreign languages. They support ISO (International Standards Organization) Latin 1 standard for Western Europe and ISO Latin 2 standard for Eastern Europe. "Digital is establishing a market presence for these terminals in the former Soviet bloc countries," according to Cotton. Some Asian languages are available but are not yet in the mainstream and so are not cost-effective, he added.

"We have run 10 different languages

*Continued on page 32*

# X Terminal:

A telemarketing representative at a financial services company works from a Digital Equipment Corp. VXT 2000 X terminal that runs off your department's RISC DECstation 5000. Similar systems are dedicated to customer support, accounting, order inventory and purchasing, all running off Ultrix, Unix or MS-DOS hosts.

In the past, the representative would have had to log in and out of four or five databases to get information, a process riddled with opportunities for keystroke errors. With Digital's VXT 2000 terminals, however, users can have database applications from different departments and heterogeneous hosts displayed as they run simultaneously in windows on their screens.

According to Digital representatives, this scenario is accomplished every day by the 20,000-installed base of VXT 2000 terminals currently in use. To function across heterogeneous hosts, a second Digital product is needed, the InfoServer 150 network terminal server, according to Larry Cabrinety, Digital's vice president of the Video, Image and Print Systems Group in Westford, Mass.

This VXT 2000 terminal family is a line of nine X-windowing terminals introduced last December, ranging from monochrome, gray-scale or color versions in 15-, 17- or 19-inch monitors. At the low end is the monochrome 15-inch, single-box VXT, complete with 4 MBytes of main memory. At the high end is the 19-inch, color VXT 219A terminal with main memory expandable to 16 MBytes. All VXT systems are expandable to 16 MBytes.

The monitors' resolution is 100 dots/inch, with a flicker-free refresh rate of 72 hz. A choice of thick-wire, Thin-Wire or twisted-pair Ethernet connections is available. All VXT terminals use the Motif window manager as their local window manager.

The CPU for these systems is the SOC (System on a Chip) - the 10e microprocessor - the standard for the DEC MicroVAX 3000 and DECstation 3000 families, with a 60-nanosecond clock speed. The SOC is compatible with all available software used on VAX and DECstation systems.

The InfoServer 150, also introduced last December, is a specialized terminal

# Digital's 'Universal Desktop Device'

server that acts as a companion product to the VXT 2000 family of terminals. Via a derivative of Digital's standard LAT (Local-Area Transport), the InfoServer150 uses the LASTport (Local-Area Storage Transport) protocol.

Via LASTport, the InfoServer 150 offers high network performance by offloading host functions onto the server to provide automatic load balancing across the network, automatic downline loading of fonts from the host and unlimited virtual memory for the terminals via demand paging. Additional options are available, such as the Bookreader service, which is the ability to store large amounts of information on a CD-ROM that can later be accessed and displayed on an X terminal, according to Cabrinety.

"The InfoServer allows the network manager to segment the network traffic to particular portions of Ethernet by individual work group," said Vic Bellemare, Digital's program manager for the VXT 2000 line in Westford, Mass. Terminals will boot from the InfoServer; they will get their virtual memory, window manager, fonts and DECterm from the InfoServer so that the only thing the user needs from the host via TCP/IP or LAT is the application itself.

The VXT terminals, unlike traditional text terminals, which functioned neatly in host-based configurations, are specifically targeted for distributed, client-server computing in multivendor networks, according to Bellemare.

"We offer total automatic load balancing across the network, via LASTport, which automatically moves the resource load from the host so that it does not bring down the system when resources are heavily used," Cabrinety added.

## An open system?

"Digital's competitors will throw stones at the InfoServer, saying that it is a nice concept and that it improves efficiency, but they will say it is not a true open system," said Jack Roberts, principal analyst for Graphics and Displays at Dataquest, a market research firm in San Jose, Calif.

But, according to Digital, VMS or other network systems managers who must manage multivendor networks and the Hewlett-Packard, Sun, VMS, Ultrix and MS-DOS users on them, can cus-



**The VXT 2000 terminal family includes monochrome, gray-scale or color versions in 15-, 17- or 19-inch monitors. All VXT systems are expandable to 16 MBytes. The monitors' resolution is 100 dots/inch, with a flicker-free refresh rate of 72 hz.**

tom-configure groups of users.

"The VMS systems manager also has complete systems management configuration control at his fingertips with our new VXT terminals and InfoServer," Cabrinety added, claiming that competitive systems do not offer that facility.

"You can't do that just by putting X on a system and expecting it to be easily configured. With our system, we have virtual unlimited memory," he added.

As an example of dedicated configuration capability, Cabrinety said the VMS network manager can configure 20 VXT terminals to be used by technical support users, 20 for telemarketing, 20 for online transaction processing and 20 for customer support, all running windows from multiple hosts simultaneously.

Market analysts cited another advantage of Digital's VXT/InfoServer solution: It saves systems management expenses by having one network manager at a central location for X terminals on desktops across a multivendor network. The network manager can handle X terminals in a multivendor network of MS-DOS, Unix, Ultrix and VMS systems from one location.

"If you want to see where X is going, look at someone who is managing 200 to 300 VAXs from a technical support site," said Wes Melling, program director for Midrange Computing Strategies for the Gartner Group in Stamford, Conn. "That gives you a model of the relative ease with which distributed computing, intelligent workstations and X terminals will be managed by the middle of the decade."

Workstations are approximately 50 percent higher in annualized systems management costs than X terminals. PCs cost approximately 30 percent more in annualized systems management costs than X terminals, according to Cabrinety.

Ultimately, Digital wants its VXT 2000 family to become the "universal desktop device," Cabrinety said. It expects to sell 25,000 by the end of 1992, 40,000 in 1993 and 80,000 in 1994.

A 15-inch VXT monochrome terminal with 4 MBytes of main memory is priced at \$1,595. A high-end, 19-inch, color VXT terminal with 4 MBytes of main memory is \$5,395. An InfoServer costs \$6,300, with up to 20 seats per server. ■

## InfoServer

*Continued from page 27*

where the InfoServer contrasts with file servers. The InfoServer does not impose a file system on its virtual devices. For DOS clients accessing one of the InfoServer's CD-ROM drives, that drive will simply look like any other drive (generally, G: or higher). For Apple Computer Inc. Macintosh clients, there is a separate InfoServer icon provided in the InfoServer client software. Any client can mount a volume stored on the InfoServer and it would appear the same as any other locally stored volume.

### Reaping the benefits

One system manager who understands the difference between an InfoServer and a file server and has been reaping the benefits is Bill Delhan, coordinator of computer services at Mesa Community College outside of Tempe, Ariz. Delhan is using two InfoServers (an InfoServer 100 and an InfoServer 150) to provide virtual disk services to 12 diskless, 386-

based DOS workstations scattered around the college's library. All network services to the PCs are provided by Digital's Pathworks.

The InfoServers are connected to each other and to a VAX 6430 in the college's administration building via thick-wire Ethernet. Delhan emphasized that the InfoServers do not count on the VAX for any file services. They provide any needed temporary disk services from their own internal hard drives to the clients over ThinWire Ethernet.

At the 21,000-student college, the 12 CD-ROM drives in the InfoServers are primarily being used to provide read services to the client terminals for such things as reference materials, periodical abstracts, textual information and maps. In order to take greater advantage of the speed of the InfoServer, computer service technicians at the college removed many of the search engines from the different CD-ROM disks and loaded them directly into InfoServer memory.

"By taking the search engines on the different CDs off the disks and [putting them] onto the InfoServer, we've found that searches go a lot faster," Delhan said. ■

## DEC printers

*Continued from page 29*

shared resource and that a print strategy can increase efficiency and save money, he noted.

With low-end laser printers dropping below \$1,000, few companies have seen the need to implement extensive print strategies. Instead of having a strategy, company MIS directors respond to user demand by buying an additional printer. The result is a majority of a company's printers standing idle most of the time, while the cost of maintenance goes up, McDonald said.

Printing with a high-capacity printer, such as Digital's PrintServer 32 (at 32 pages per minute), can cut a company's cost per page. When used with a judicious mix of personal printers, the networked PrintServer's ability to churn out 150,000 pages per month makes for a cost-effective print strategy, he said.

"Printing is not really looked at in most companies as a strategic issue. It's a tactical issue," said IMR's Maynard. "Until they can't get out a report, people don't recognize the printers." ■

## Dumb Terminals Remain Preferred Device for Many

*Continued from page 30*

simultaneously off one host. This means you could have 10 employees working in 10 different languages on terminals all hung off the same host," said Cabrinety. These terminals are the lowest-cost display device you can use to communicate in different languages, he added.

Another factor affecting the terminal market is the recently established AlphaWindow standard, which enables windowing capability on text terminals. The standard was established through the Palo Alto, Calif.-based DIA (Display Industry Association), which creates hardware and software standards for display terminals. Digital is a member of the association.

AlphaWindow terminals achieve windowing through a display server in firmware on the terminal itself working with a window manager software package that loads on the host computer. The window manager drives the terminals and the terminals run the windows. The AlphaWindow standard defines the interface between the window manager and the terminal in a series of escape sequences that define the windows and identify the sessions running in them.

The standard is expected to expand to define a standard for graphics-capable terminals.

Priced in the \$600 range, the AlphaWindow terminals will run all existing character-mode applications —

**W**hile a number of vendors have brought out AlphaWindow products, Digital is taking a wait-and-see approach.

roughly 80 percent of all existing applications without any modifications and use RS-232 serial communication lines. The windowing functions include running multiple applications, transferring information between applications and resizing. Other features are scroll bars, icons and buttons. AlphaWindow terminals can attach directly to a multiuser system

such as a DOS PC or a Unix system.

While a number of vendors including Cumulus Technology Corp. and Applied Digital Data Systems Inc., have brought out AlphaWindow products, Digital is taking a wait-and-see approach. The company declined to discuss its specific plans, if any, to develop such machines.

"AlphaWindow terminals are in our plans because windowing is the way of the world. It's just a question of timing," said Cabrinety. "People have a lot to learn with regard to making AlphaWindow terminals and it might not pay to be among the first out with such machines," Cotton added.

With 5.5 million terminal devices sold last year (according to International Data Corp., a market research firm based in Framingham, Mass.), dumb terminals appear to remain the smart choice for a multitude of customers. "These machines fit in nicely," said Cabrinety. "They give users all the basic applications, are simple to operate, inexpensive, and work with any kind of a host on any kind of a network. Realistically, traditional terminals will be around the rest of this decade." ■

# DEC rolls out services

Woos users with DECAvantage integrated platform

By Melinda-Carol Ballou

Digital Equipment Corp. is already taking up the "Solutions Provider" banner from Chief Executive Officer and President Robert Palmer by announcing new services.

Earlier this month, the firm released DECAvantage integrated hardware/software platforms for Intel Corp.-based servers and revealed that preinstallation of NetWare v3.11 is an option for the Application DEC 400xP server. DEC also began shipping Pathworks for The Santa Cruz operation's SCO Unix V1.0.

"The most interesting thing to me is the packaging and factory installation of NetWare and other applications because those are the kind of services which are in wide demand from customers, regardless of whether they are small or large," said Bill Bluestein, an analyst at Forrester Research, Inc., a market research firm based in Cambridge, Mass.

DECAvantage platforms are certified to run on DEC's Application DEC 400xP, Application DEC 433MP and DECpc 400ST Intel-based servers. They include pretested hardware — application packages, utilities, tools and networking software — to make the servers easier to install, integrate and operate, DEC officials said.

"DEC is trying to leverage its service capabilities ... by bringing servers into big PC networks and offering good support," said Lou Brentano, an analyst at Computer Intelligence/Infocorp in Acton, Mass. There's a hole right now in the PC arena — there are products to integrate [disparate PCs] and networks, but users need someone to service it all."

Brentano described a situation at his company — an eight-node site — where two out of four printers ceased functioning when a new printer was brought in.

"What if our site had been an entire company and all the printers went out? You need someone you can call," he said.

Purchasing the preinstalled NetWare option will save one or two days for those configuring the system, depending on the complexity of the network, Brentano said. The preconfigured DECAvantage servers can be a real time and headache saver, though he offered one caveat in his assessment: "What I don't know and the market will have to judge is how flexible the pre-configuration menus are going to be and whether they will be flexible enough to meet the needs of a bunch of users."

Some analysts questioned DEC's move to support Pathworks running on SCO Unix. "DEC has as much said that they will jump on the NT bandwagon with Pathworks. And then what will happen to the SCO business other than to go away quietly to the sunset?" asked Peter Kastner, vice president at the Aberdeen Group, a market research firm based in Boston.

But the Microsoft Windows NT-based servers are not available yet, and the SCO platforms have an installed base of more than 300,000 users, making this current focus on SCO Unix an intelligent move for DEC, according to Brentano. "The NT

servers are a ways off, and it makes sense to make use of the good Intel server, which they now have available," he said.

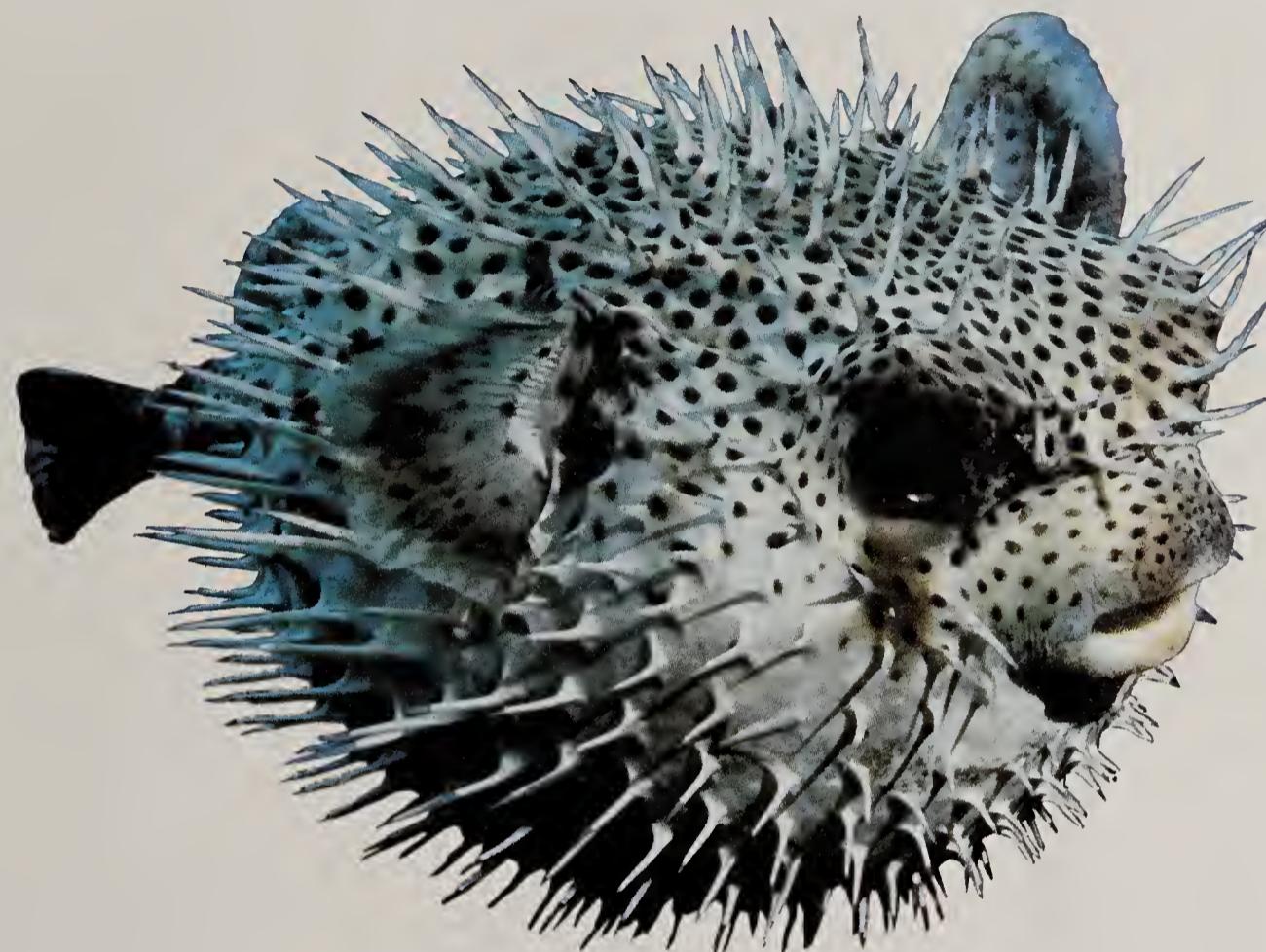
The DECAvantage products are shipping now. A sample entry-level configuration of a system management products license costs \$1,300.

## Accelerator boosts IBM workstations

Legato Systems, Inc. in Palo Alto, Calif., recently agreed with IBM to develop and market a version of Legato's Prestoserve accelerator card and software for IBM workstations.

Prestoserve's main advantage, said product manager Ranga Rangachari, is that it allows users to support more clients per server.

Prestoserve accelerates Network File System (NFS) servers. Versions for Sun Microsystems, Inc. and Digital Equipment Corp. NFS servers were introduced in 1989 and 1990, respectively. The product can double server NFS operation throughput or reduce operation average response time by 50% by overcoming write bottlenecks, according to Rangachari.



### SMARTSIZING

COMNET HELPS YOU GROW EXISTING ARCHITECTURES TO MEET CHANGING NEEDS

Upgrading network performance in this age of changing technology requires deft planning and a keen eye for the bottom line. You want to be able to meet the growing needs of your organization with cost-effective solutions that make the most of existing infrastructure. Find them at ComNet '93.

ComNet offers a variety of conference sessions, tutorials and workshops that cover important issues for the development of network architecture. That includes backbone options like FDDI and ATM, WAN considerations like frame relay, time division multiplexing and a host of others — from security to outsourcing to video.

The ComNet '93 show floor will contain the largest collection of networking and communications technologies in North America. Over 450 companies see ComNet as their place to roll out new offerings. You'll see all the hot products and be able to compare similar items from dozens of manufacturers. Plus, a trip to ComNet '93 at the beginning of the new year means you'll see all the new technologies while they're still new.

Find out more about why ComNet '93 has the smarts to help you manage network growth. Just fill out the attached coupon for complete conference information and a FREE exhibits pass to ComNet '93.

LIVENET

EXPERIENCE LEADING EDGE TECHNOLOGIES IN HIGH PERFORMANCE ENTERPRISE NETWORKING.

GET FREE ADMISSION TO OVER 450 EXHIBITING COMPANIES  
PLUS DETAILED INFORMATION ON ISSUES AND SOLUTIONS AT THE  
COMNET CONFERENCE, FEBRUARY 1-4, 1993, WASHINGTON D.C.  
A2

NAME/TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY/STATE/ZIP \_\_\_\_\_

MAIL TO: COMNET '93, P.O. BOX 9107, FRAMINGHAM, MA 01701-9107

PHONE: 800-225-4698 OR FAX TO: 508-872-8237



FEBRUARY

1-4, 1993

WASHINGTON, D.C.

ComNet™ is produced by World Expo Corp. and sponsored by Network World.  
LiveNet is sponsored by Computerworld.



# “Doing your own network integration?

## Time-out!”



*Ralph Ungerma*

Ralph Ungermann  
President, CEO

Most IT professionals tell me they would prefer to

work with a strong network integrator rather than buying from many independent product suppliers.

And yet, they buy bridges, routers, adapter cards, smart hubs and network management, etc., from

dozens of suppliers. Why? **U** Because they equate picking an integrator with having to settle for second rate technology. The only way out is to buy networks in pieces and shoulder the nasty job of integration

alone. Time-out! **U** At Ungermann-Bass, we

don't think choosing between the "Best of Breed"

and "One Stop Shopping" is a choice you should

have to make. **U** That's why we're the first

networking company to combine leading edge

products with leading edge integration. At

Ungermann-Bass, network integration is just as

important as technology. Now you can have the

"Best of Breed" from a single source. **U** If your

company would benefit from a business partner

who is as obsessed with the performance of your

network as it is with product innovation, call

Ungermann-Bass at 1-800-777-4LAN.

**U** **Ungermann-Bass**

Your global network integration partner

# CW nears migration goal

Part of a series of reports on Computerworld's migration to a Unix-based client/server system.

By Maryfran Johnson

The worst is over now—or so we hope.

And one result of *Computerworld*'s merry march from outdated, proprietary systems to client/server computing is in your hands. Literally.

This week's issue showcases our redesigned newspaper and the \$850,000 of new technology behind it. The entire publication is now produced under Atex, Inc.'s new Unix version of its Workgroup Publishing Software, which runs on a pair of IBM RISC System/6000 Model 530 servers.

While a more sane group of people might have set aside 18 months to accomplish a mission-critical conversion project and a complete redesign, *Computerworld*'s management chose Comdex/Fall '92 as the do-or-die deadline for both. That meant accomplishing everything in one frantically stressed-out year.

"My staff is completely stretched, but we're down to the wire and we will be done," said Linda Nelson, *Computerworld*'s information systems director. "Any problems that turn up now will be minor and fixable."

A recent trial run of our new design with a select group of subscribers yielded generally positive feedback.

## Built-in flexibility

The basic format of *Computerworld*'s pages has been altered so our layouts can be more easily varied, which opens up design possibilities that have our art department positively giddy.

Even the colorful little icons, which jazz up the look of the pages, are crafted for quicker deciphering. Also, the new system will allow us to save a day or more of paperwork shuffling by allowing copy editors to produce text boxes on their workstations rather than sending that work to artists.

The client end of *Computerworld*'s new setup includes 50 IBM Personal System/2s and IBM clones from DTK Computer, which on the reporters' desktops will run Microsoft Corp.'s Windows 3.1 and Atex Writer software, based on Xyquest, Inc.'s Xywrite package. Although most of the machines are installed, staff training for the reporters will not be completed until mid-December.

In the meantime, our Digital Equipment Corp. PDP-11 minicomputers are linked to the RS/6000s over a common Ethernet backbone.

Atex provided a specially written Unix daemon for the AIX Unix-based operating system, which monitors the old system and automatically transfers stories to the RS/6000 servers for retrieval by the copy desk. That was one transition tool that made the mid-November conversion deadline workable, Nelson explained.

The copy editors are 100% up and running on the new system—a critical milestone for producing the redesigned pages.

"Our major goal for the next few weeks is to get through this and keep our sanity," said Executive Editor Paul Gillin, who recently gave the copy editors sweatshirts labeled "Hurricane Atex '92: The Survivors."

Managers said they appreciated the straight talk they got from IS. "Linda always presented this to us as a difficult, painful process, and she always kept us informed," Gillin said.

"One of the hardest things to avoid is too much optimism," he added.

"The demos that vendors show you look really spiffy, but they're usually an order of magnitude

better than what you can actually do," Gillin said.

While the road to client/server systems has been rockier than the managers expected, there were never any catastrophic data losses, Nelson pointed out. "We've wiped out the data on the backup server a couple of times, but we were always able to recover—from either the primary server or from the last backup tape—without impacting the users," Nelson explained.

One remaining software gap involves the Writer software, which works under DOS 5.0 but not Windows. Atex and Xywrite are working to resolve that now. "One of the problems of working on standard platforms is that often the vendors have to rely on other vendors to supply some portion of their application," Nelson said. In this case, Xywrite needs to make a few

adjustments to its software to enable it to run under Windows.

"Overall, Atex has really come through for us in a big way," Nelson said. Atex supplied its most knowledgeable technical expert, Dora Jeffers, who practically lived at *Computerworld* during the conversion and was on hand as system bugs were found and eliminated.

One nerve-racking prospect still on the horizon, however, is the possibility that Atex's parent company, Eastman Kodak Co., will sell Atex. "I'm not feeling comfortable about that, but Kodak has said they won't sell Atex to a competitor who then shelves the software," Nelson said.

Even if that happened, however, there are contractual provisions in place to assure *Computerworld*'s access to the Atex source code and continuing support, she added.

## At a glance

For the past 10 years, *Computerworld* has used an Atex publishing system running on a DEC PDP-11-based hardware platform with dumb terminals and character-based writer and production software.

Today, we have a client/server system that uses dual IBM RS/6000 servers and Intel Corp. 486-based PCs as clients. WYSIWYG production software is in place, and Windows-oriented word processing is being developed.

Page production is now done totally on the new system, with writer workstations being phased in during the coming weeks.

**Cost of the project:**  
\$850,000.

**Benefits:** Faster turn-around, a more flexible design, complete text/graphics integration.



**CW chief copy editor Catherine Gagnon (left) and IS director Linda Nelson coordinated systems, design and copy flow under tight editorial deadlines**

# Microsoft picks copper

CDDI gives the speed of FDDI without the cost of fiber

## Ethernet galore

Microsoft has a worldwide network of 24,000 nodes, 99.8% of which are running Ethernet. About 15,000 of the computers are located at the company's Redmond, Wash., campus. Planning for growing bandwidth is an ongoing process for the company.

**■ "It was an easy decision," Dave Leinweber, senior manager of corporate networks at Microsoft Corp., said about choosing Fiber Distributed Data Interface (FDDI) over copper to enable 100M bit/sec. speeds from servers and desktop machines.**

Leinweber estimated that he would save between \$2,000 and \$2,500 per station using FDDI over copper rather than fiber. The savings included the price of adapter cards, concentrators and cabling.

Copper Distributed Data Interface (CDDI) "gave me the speed of FDDI without the cost and support of running fiber to desktop," he said. "And the CDDI adapter card wound

up being one of the fastest we tested."

Since 1989, when Leinweber installed an FDDI backbone made by Ungermann-Bass, Inc., he had planned to install FDDI Extended Industry Standard Architecture adapters in file servers and high-level workstations someday, namely for Microsoft's software engineers whose development work was sure to tax available bandwidth.

This fall, while Leinweber was evaluating desktop FDDI technology from "all the major vendors," Crescendo Communications, Inc. in Sunnyvale, Calif., came out with adapters that use FDDI transmission protocols over copper wiring. Leinweber tested the Crescendo cards on three workstations and found a 300% boost in throughput.

"That's at the low end," he said. "I'm hoping to get higher throughput as we install servers that support symmetrical multiprocessing."

Over the next eight months, Leinweber said, he plans to install some 200 copper FDDI stations using high-quality Category 5 data-grade unshielded twisted-pair wiring that was preinstalled in Microsoft's main engineering building. The first stations will be operational in about three weeks, he predicted.

Installing FDDI over copper before standards are published does not worry Leinweber because, he said, he attended standards meetings and thinks standards will be completed next year. Once standards are established, he will move more than half of the company's roughly 5,000 development engineers to FDDI over copper.

## Gigaswitch on its way

Planning for growing bandwidth needs is an ongoing process for Leinweber. He said that adding 100M bit/sec. servers and stations

on the fiber backbone will test its limits. Rather than breaking networks into smaller subnetworks, he said he plans to deploy a DEC FDDI Gigaswitch by next summer.

The Gigaswitch—a 3.6G bit/sec. switch that DEC said it expected to ship in the first half of 1993—includes FDDI ports. Using switching technology similar to Asynchronous Transfer Mode (ATM), the Gigaswitch will interconnect FDDI networks, switching from one FDDI port to another port. Because it is a true matrix switch, the actual bandwidth is the sum of all the connected ports, he said.

Leinweber's plans include using ATM for metropolitan or wide-area network connectivity. He said he does not expect to move ATM to the desktop in the next five years because he does not see the technology taking off. He is also watching 100M bit/sec. Ethernet developments. "The important thing is that CDDI solves our problems today. I can't base our overall strategy on promises," he said.

Why combine a number of SPARCstations,



when a network of HP workstations and X stations operates for less?



It just stands to reason. The more engines, the more cost. Not only in initial purchase price, but system administration, backups and OS updates. That's why more and more people are getting on board with an HP workstation/X station network. A powerful engine that carries plenty of passengers.

At Hewlett-Packard, we understand that not every situation requires a workstation. A network of our Series 700 workstations and 700/RX X stations can give users full PA-RISC workstation functionality and HP's industry-leading speed at a fraction

of the cost of a Sun SPARCstation network. And as your operation grows, workstations can be upgraded and X stations easily added.

Whether you're in customer service, manufacturing, finance, engineering, or the hospitality industry, you'll enjoy the benefits of central system administration, low cost of ownership, and access to network-



wide resources. And your HP solution isn't just a good investment to start with—it remains one for the long haul.

No wonder HP is recognized as the worldwide leading supplier of color X stations, and is delivering workstations with the highest performance.

To get on board, call 1-800-637-7740, Ext. 7098. In Canada, call 1-800-387-3867, Dept. 2308.

 **HEWLETT  
PACKARD**

# Get a better deal on a better 1-2-3

Now that's good news for anyone buying a Windows™ spreadsheet. First, we recently updated 1-2-3® for Windows so it now gives you more of the features you've been looking for in a Windows spreadsheet. Second, we lowered the price to just \$495.\* (Plus, for upgraders, and for a limited time only, we've included the SmartPics™ Clip-art Sampler absolutely free.)

Of course, when you come right down to it, there are plenty of other reasons why 1-2-3 for Windows is the best spreadsheet choice you can make.

Its features and performance are better than ever.

1-2-3 for Windows now includes more

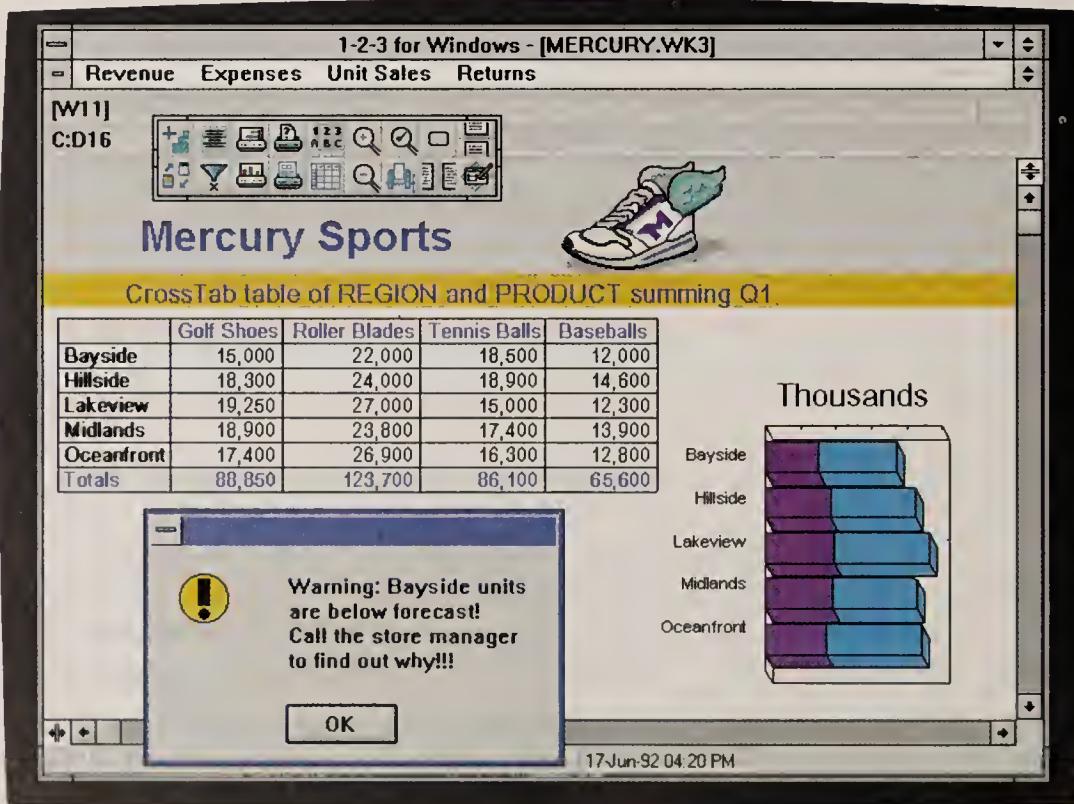
than 25 new features and usability enhancements, as well as a robust set of GUI development tools.

Recent performance enhancements also make 1-2-3 for Windows the fastest-printing Windows spreadsheet for Postscript® output. It also makes the most efficient use of system resources when handling 3D files.

Better still, we're offering license packs for network users so you can set up your network configurations more cost-effectively. All of which makes Lotus 1-2-3 for Windows the best deal in a Windows spreadsheet.

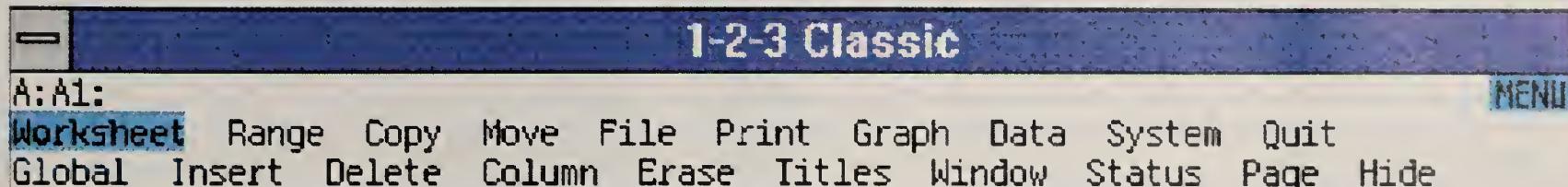
It's a better transition from DOS to Windows.

Only 1-2-3 for Windows, with its built-in Classic® Menu, lets you use familiar 1-2-3



commands whenever you choose. Excel, on the other

*Corporate Computing* (8/92) wrote that "for the experienced 1-2-3 database



hand, only supports 80% of 1-2-3 Release 2.01 commands. And has no support for releases beyond.

What's more, only 1-2-3 for Windows offers you a better compatibility bridge from DOS to Windows. And unlike Excel, 1-2-3 can read and execute *any* 1-2-3 for DOS file, style and macro.

All of which means you'll retain your full investment in 1-2-3 for DOS files when you move to 1-2-3 for Windows.

**Its 3D technology and external data access capabilities are better than Excel's.**

In 3D technology, 1-2-3 is unsurpassed. It gives you easy access to 256 worksheets and lets you build true 3D formulas. Excel's Workbook is a mere imitation. That makes 1-2-3 for Windows a more powerful tool that truly helps you consolidate data, spot trends and make better, more timely business decisions.

user, 1-2-3 for Windows with DataLens is the front-end tool of choice." Excel's data access capabilities rely on a third-party product with limited relational capabilities.

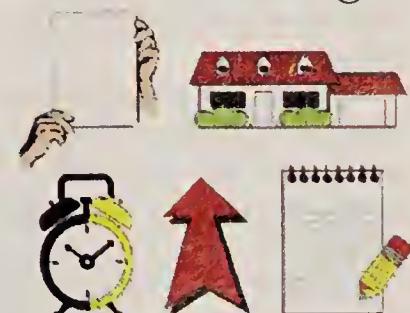
**There's no better time to act than now.**



Remember, for a limited time only, when you upgrade to 1-2-3 for Windows, we'll give you a SmartPics Clip-art Sampler absolutely free. It includes over 100 clip-art images to help you better communicate through your spreadsheet; it'll do the same with any Windows application.

Of course, we still offer our unique Technology Guarantee which allows you to upgrade for just \$49 to any new version of 1-2-3 that is introduced within six months of your purchase.

So if you're ready to take advantage of this great upgrade offer, just see your Lotus Authorized Reseller or call 1-800-TRADEUP, ext. 7088.\*\*



# 1-2-3 for Windows

**To find out more about Lotus and Working Together™ in Windows, visit Booth #2842 at Comdex.**

## New Products

### LAN hardware

Racore Computer Products, Inc. has introduced the M8110, M8111 and M8112, 4M-byte 802.5 Token Ring adapters.

According to the company, the M8110 is a 16-bit XT/AT bus interface that is compatible with IBM AT or compatibles; the

M8111 is Micro Channel interface is compatible with the IBM Personal System/2 or compatibles; and the M8112 is an 8-bit XT/AT bus interface that is compatible with IBM PC/XT, AT and compatibles. Each of the adapters operates with Type 1 shielded cable and Type 3 unshielded cable with an optional media filter and conforms to IEEE 802.5 and 802.2 Token Ring standards.

The adapters support network environments including Novell, Inc. NetWare 286,

386, IBM PC Network and Microsoft Corp.'s LAN Manager, among others.

The adapters start at \$195.

►Racore Computer Products  
170 Knowles Drive  
Los Gatos, Calif. 95030  
(408) 374-8290

### Workgroup software applications

Telephoto Communications, Inc. has introduced Alice-SPC JPEG Image Compre-

sion and File Conversion software.

The software was designed for Sun Microsystems, Inc. SPARCstations and compatibles. The Alice-SPC software can be used for archiving, retrieving and displaying full-color and gray-scale continuous tone images.

It supports all of the popular pixel formats and image file types, the company reported.

Cross-platform connectivity is offered, and Alice-SPC operates in SunOS, Solaris and Open Windows environments. Support is provided for eight- and 24-bit color and gray-scale adapters as well as the Sun-Raster and Tag Image File Format formats.

Alice-SPC costs \$495.

►Telephoto Communications  
Suite D  
11722 Sorrento Valley Road  
San Diego, Calif. 92121  
(619) 452-0903

Systems Union, Inc. has introduced Version 4.0 of its SunSystems accounting and financial management software.

The software includes a new graphical user interface that runs in Microsoft Corp.'s Windows 3.1 and IBM's OS/2 2.0 environments. According to the company, Windows and OS/2 users operating Version 4.0 accounting modules can run multiple screens and perform multitasking with drop-down menus.

Interoperability is provided across platforms including Novell, Inc. and other leading local-area networks, all PC operating systems, Unix and a number of reduced instruction set computing systems such as Hewlett-Packard Co.'s HP9000 and IBM's RISC System/6000.

Pricing begins at \$1,700.  
►Systems Union  
10 Bank St.  
White Plains, N.Y. 10606  
(914) 948-7770

### Modems

Shiva Corp. has introduced NetModem/E for Windows for Workgroups.

The product is a remote networking server for Microsoft Corp.'s Windows for Workgroups operating system Version 3.1. It was designed to enable users to more easily access their workgroup resources from any standard telephone line.

NetModem/E is a dedicated hardware device that plugs into the workgroup's Ethernet cable and a telephone line. It does not require a PC, keyboard or display screen. Connection is available for remote users by using a standard modem.

Remote users receive all of the same capabilities offered by the Windows for Workgroups operating system, including Microsoft Mail, Microsoft Schedule + and file sharing.

The product has security features that include passwords, dial-back phone numbers and individual user names, according to the company.

NetModem/E for Windows for Workgroups costs \$1,699.

►Shiva  
1 Cambridge Center  
Cambridge, Mass. 02142  
(617) 252-6300

# OLICOM MAKES TOKEN-RING NETWORKS WORK FASTER

### This advertisement: remote bridges

Sluggish response, slow throughput, poor bandwidth utilization....

Recognize the symptoms?

They're the Token-Ring network "blues," the result of using adapters, bridges, routers and other products that can't keep up with your company's data communication requirements.

Olicom has the cure in the form of some of the fastest Token-Ring products on the market—like our 16/4 Mbps remote bridge. In a test conducted by *Data Communications* magazine last fall, it outperformed 13 other manufacturers' products. Including IBM's.

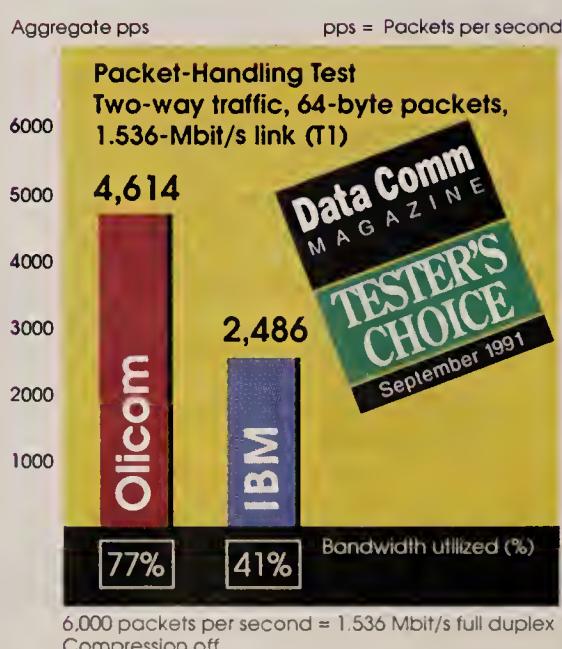
### Second in size, first in performance

Olicom is already the second largest Token-Ring supplier in Europe (trailing only IBM) and a fast-growing presence in the United States. Our Token-Ring solution supports all industry-standard network operating systems. And all our products are 100% IBM compatible and interoperable.

About the only thing that separates our products from theirs is our more attractive price/performance. After all, you have to be a little better when you're not so big.



olicom



Olicom USA, Inc.  
900 East Park Boulevard, Suite 180  
Plano, Texas 75074  
USA  
Tel: (214) 423-7560  
Fax: (214) 423-7261

Olicom A/S  
Nybrovej 114  
DK-2800 Lyngby  
Denmark  
Tel: (+45) 45 27 00 00  
Fax: (+45) 45 27 01 01



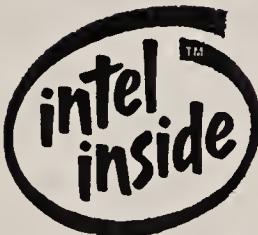
# YOUR EQUIPMENT CAN MAKE OR BREAK YOU.

With every value bundled AcerPower 486e system you purchase, you will have your choice of a \$300 CPU Upgrade Rebate, a second year of Free Premium Service, or your choice of 1-2-3<sup>®</sup>, AmiPro<sup>™</sup>, or Freelance<sup>™</sup> from Lotus<sup>®</sup>.

You need dependable computing equipment from a company you can count on. With this in mind, Acer has created the new AcerPower<sup>™</sup> 486e family (DX/33, DX2/50 and DX2/66)—perfect as a power workstation or enterprise-wide server. And for a limited

time, Acer is offering a special Investment Protection Program.

Call 1-800-SEE-ACER for more details or to receive a quote within 72 hours. Hurry, this offer ends 2/15/93!



## 486DX2/50 BUNDLED EISA COMPARISON

Model	AcerPower 486e Model 5557	AST <sup>®</sup> Power Premium <sup>®</sup>	Dell <sup>®</sup> DE 486DX2/50	Gateway <sup>™</sup> 486DX2/50 E
Memory Std./Max.	8MB/256MB	4MB/80MB	8MB/96MB	8MB/64MB
Monitor	UVGA-NI	No	UVGA15-NI	UVGA-NI
Hard Drive	210MB	210MB	230MB	340MB SCSI
Expansion Slots	(8) 5 EISA/2 ISA/1P	4 EISA	6 EISA	8 EISA
Local Bus/Flash BIOS	Yes/Yes	Yes/Yes	No/No	No/No
MSRP*	\$3,299	\$3,695	\$3,469	\$3,595

\*Prices effective 9/21/92.

FOR AN INSTANT DATASHEET AND MORE INFORMATION ON THE INVESTMENT PROTECTION PROGRAM, CALL THE ACER FAX HOTLINE AT 1-800-854-6990.



# Acer



CALL 1-800-SEE ACER

Acer and the Acer logo are registered trademarks, and AcerPower is a trademark of Acer America Corporation and Acer Incorporated. Intel and Intel Inside are trademarks of Intel Corporation. All other trademarks are the property of their respective companies. © 1992 Acer America, Inc.

(What is it?)



**It's an SNA gateway.** (That's nothing new.) **It's also a local router.** (Excuse me?) **It's an SNA gateway and a local router** (You mean in one product?) **in one product. So it provides you with two solutions in one:** (Let me guess; the functionality of a gateway along with the performance of a router.) **the functionality of a gateway combined with the high-performance of our router's SPARC processor.** (I was close.) **Since this new product** (I think it should be called a gateway-router.) **performs two functions at once, it offers unprecedented levels of administrative convenience and manageability.** (But does it access multiple LANs?) **It also accesses multiple LANs, including Token-Ring, Ethernet, and LocalTalk,** (Ask a stupid question...) **and supports mixed PC environments such as Windows, Mac, and DOS.** (Holy Toledo.) **Naturally, our Netway gateway-router** (Hey, that's *my* name for it.) **can route Novell IPX and AppleTalk protocols,** (And?) **and comes complete with powerful 3270 services like terminal and printer emulation.** (I wonder who came up with this thing.) **As you might have guessed by now, the company behind this revolutionary product is Avatar,** (I should have known.) **leaders in SNA connectivity for over a decade.** (Must be about time for the obligatory 800 number.) **For more information, and our free "Gateway-Router Guide to Network Manageability," send in the coupon or call 1-800-AVA-3270.** (A free gateway-router guide? You must have read my mind.)



Send to: Avatar, 65 South Street, Hopkinton, MA 01748-2212 © 1992 Avatar Corporation. All trademarks are the property of their respective companies.

## Router rivals unveil 3-phase ATM plans

By Joanie M. Wexler

Amid the Asynchronous Transfer Mode (ATM) statement-of-direction blitz, the two leading router vendors last month sketched out plans for evolving their customers to high-speed switched networks based on the multimedia-oriented technology.

Cisco Systems, Inc. and Wellfleet Communications, Inc. both issued three-phase ATM strategies, with Cisco's culminating in an ATM network interface card for its router in early 1994. Wellfleet went a step further by committing to integrating an ATM switch into its high-end Backbone Node router "over the next few years."

Wellfleet's articulated plans to leverage its gigabit-backplane Backbone Node for ATM switching are more in sync with statements made to *Computerworld* by the presidents of both Wellfleet and Cisco in June that the companies were considering getting into the ATM switch business [CW, June 29].

Cisco, however, said recently that the plans it revealed — which include evolving its Switched Multimegabit Data Service network access device to an ATM version in early 1993 — do not necessarily represent its complete ATM strategy.

"As new switches and interfaces

become popular, they will become part of Cisco's strategy," a company spokesman said.

Cisco's intentions with ATM are important to customer Lehman Brothers in New York "because we expect in the next couple of years there will be workstations that require ATM bandwidth in hubs and routers," said Victor Duchovni, senior systems analyst. He said that while "we don't need all the Cisco specifics yet," he would eventually like to see ATM switching within his Cisco routers or Cabletron Systems, Inc. wiring hubs.

"What kind of performance will come out of the router if it does not incorporate ATM switching at some point?" he wondered.

Wellfleet's stated ATM intentions are a step ahead of Cisco's, with its Phase 1 for an external ATM access device corresponding to Cisco's Phase 2. Wellfleet's Phase 2 plan for an ATM interface maps to Cisco's Phase 3.

Wellfleet's third-phase commitment to an internal switching architecture "helps us plan for the Wellfleet router to continue to play a part in our network infrastructure," said Ameet Patel, emerging technologies analyst at BASF Corp. in Parsippany, N.J., and president of the 80-company Wellfleet User Group.

With its ATM switching capabilities, Wellfleet will likely compete directly against the ATM switch vendors such as Adaptive Corp. and Fore Systems, Inc., noted Fred McClimans, program director at Gartner Group, Inc., a consultancy

Router rivals, page 103

### ATM strategy

**Key points of Cisco Systems, Inc.'s and Wellfleet Communications, Inc.'s ATM plans.**

**Cisco expects to provide an ATM network interface card for its router in early 1994.**

**Wellfleet says it will go a step beyond rival Cisco by integrating an ATM switch into its high-end router.**

## IBM to support frame relay, ATM technology

By Elisabeth Horwitt  
SAN FRANCISCO

**■ IBM's plans for broadband networking call for the company to have frame-relay offerings in place by mid-1993 and Asynchronous Transfer Mode (ATM) products within the next few years. However, executives made it clear that IBM has no plans to support the Switched Multimegabit Data Services (SMDS) standard that is considered a rival standard to frame relay.**

Speaking at a meeting of the Frame Relay Forum during the Interop '92 show, Ellen Hancock, general manager of IBM's Networking Systems Division, said "a full complement of frame-relay products" will be available from IBM by the middle of next year. This fall, IBM announced frame-relay switching capabilities for its 3745 front-end processor, as well as the RouteXpander 2 card, which is said to convert an OS/2-based Personal System/2 workstation into a frame-relay gateway for Token Ring local-area network clients.

Frame relay is specified to run from fractional T1 speeds to 45M bit/sec. (T3); SMDS from 1.5M bit/sec. (T1) to 2.5G bit/sec.; ATM from T3 to 622M bit/sec., and it is said to be more suitable than frame relay for supporting voice and video transmissions.

### Around the bend

Coming in the next 18 months, Hancock said, are frame-relay products for IBM Application System/400 and RISC System/6000 platforms. IBM has announced plans to put frame relay on the 6611 router but has no plans to do the same with its traditional Systems Network Architecture (SNA) controller, the 3174, Hancock said.

In the shorter term, IBM said it intends this month to announce products that deliver multimedia over Integrated Services Digital Network (ISDN) links, to Token Ring LANs, Hancock said.



"IBM has talked with customers, and it is clear that frame relay is easier than SMDS, causes less disruptions on the network and does not require [them to install] new hardware and software," Hancock told her Frame Relay Forum audience. "We are spreading frame relay across our product set," in preparation for the higher speed ATM products, she added.

### Holding back

Hancock was less specific about IBM's ATM plans. The vendor is "waiting to see carriers' deployment" before deciding whether just to roll out a campus ATM switch initially or a wide-area network switch as well, she said. IBM will not necessarily put ATM on the 3745 front end, Hancock said. Also undecided is whether the vendor will build its own ATM switch or source it out to a third party, she added.

IBM is also working on Advanced Peer-to-Peer Network Plus (APPN+), an updated version of its peer-to-peer SNA protocol that will be optimized for broadband network protocols such as frame relay, according to Rick McGee, manager of communication systems architecture and development at IBM. APPN+ will be a leading member of "the next generation of routing protocols" that will provide high-speed, intelligent routing of network transmissions, McGee said. APPN+ will preserve customers' investments by routing transmissions from devices that still use older network protocols such as Transmission Control Protocol/Internet Protocol and SNA, he added.

The next step after APPN+ will be a gigabit/sec. APPN, which will support ATM, McGee said. IBM is a member of the ATM Forum and is working with standards bodies to develop a silicon implementation of the protocol, IBM spokespeople said. In keeping with its promises to make its network protocols open and standardized, "IBM intends for APPN+ to converge with the ATM Forum's work on a routing protocol," McGee said.

## NY agency to add LAN connectivity

By Elisabeth Horwitt  
NEW YORK

CityNet, a 4-year-old, leased line, IBM Systems Network Architecture (SNA) network that services 85 New York City agencies and area data centers, is moving on to the next stage of its development: a hub-router configuration that will enable a burgeoning population of local-area network users to access computing resources anywhere in the greater New York area.

"About two years ago, we decided there was a LAN explosion in agencies and areas," said Pat Carragee, assistant commissioner of network systems at the City of New York's Computer and Data Communications Services Agency.

The current CityNet encompasses some 50 to 60 wiring centers made up of IBM 3745 and 3720 front-end processors con-

nected over T1 leased lines. The network has saved the city more than \$26 million by consolidating a hodgepodge of dial-up and leased-line links used by the agencies into a high-speed backbone that provides users with access to 25 IBM and IBM-compatible host data centers.

### Going for integration

However, the current configuration does not provide a way to interconnect LAN users or to support the growing need for distributed applications and electronic-mail exchanges in all five boroughs, Carragee said. Right now, all LANs installed in the boroughs are stand-alone, he added.

A request for proposals, formulated over 18 months, went out last spring. Needed is a way to interconnect approximately 400 non-SNA sites, expected to grow to 600 sites by the time the project is finished. Responses are still being evaluated.

The design the city has chosen is a combination hub and connectivity, page 107

## ON SITE

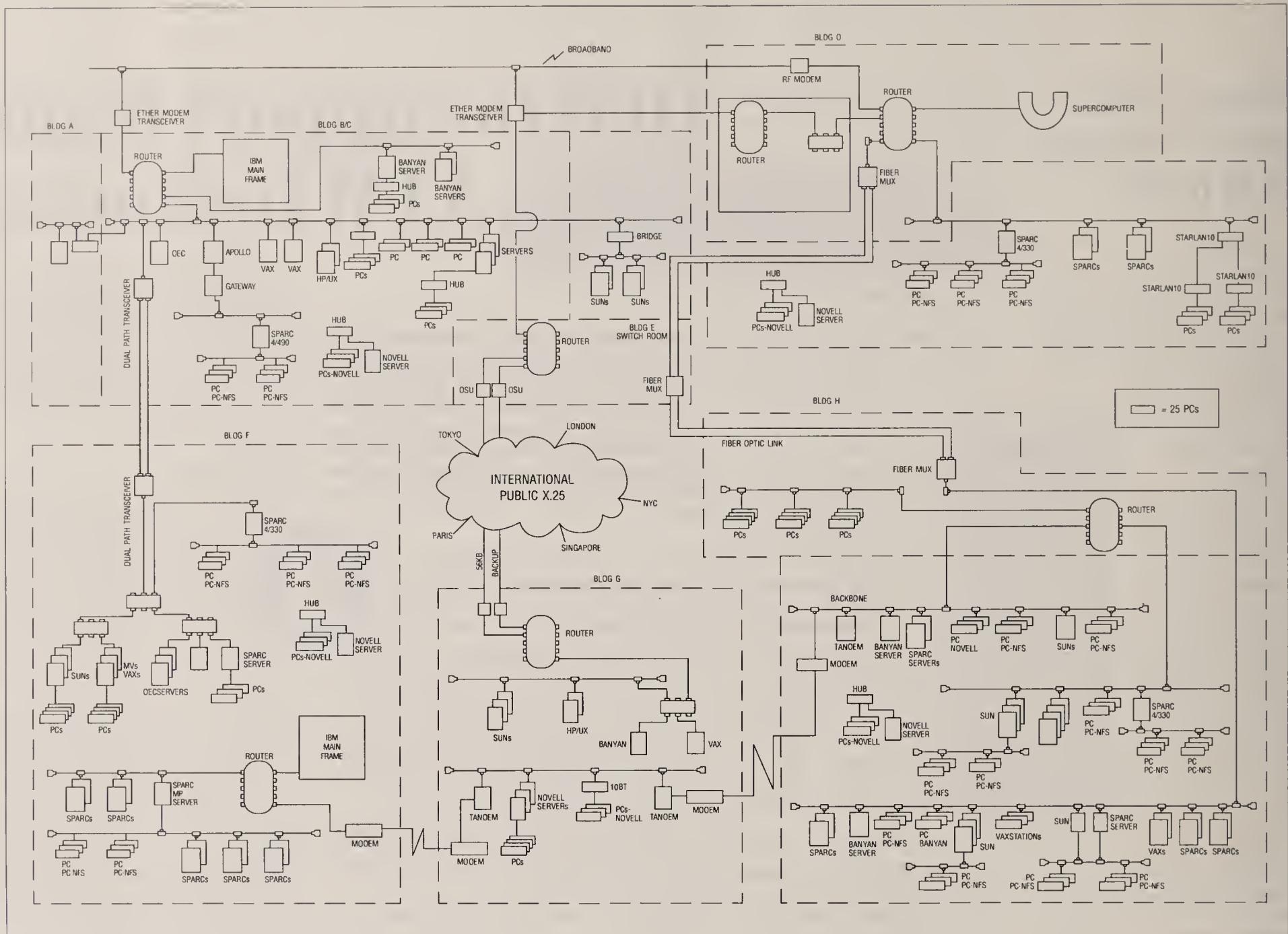
### CityNet New York

**CityNet statistics:**  
• Implemented 1989.  
• Approximately 1,800 SNA lines.

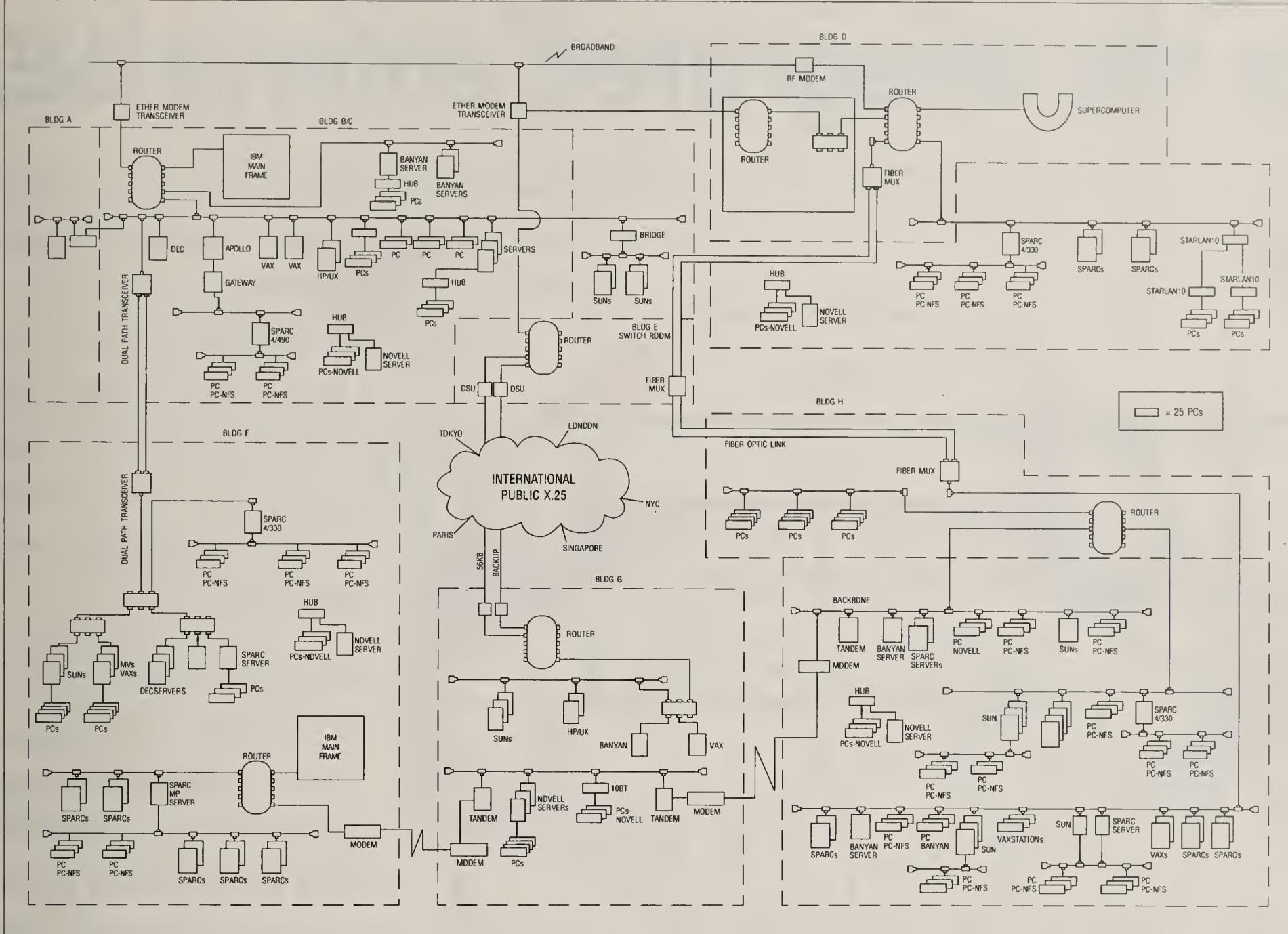
- More than 160 AS/400s using IBM Low-Entry Networking, 2,000 terminals, printers and PCs.
- Novell, Banyan LANs.
- Approximately 400 non-SNA sites, expected to grow to 600.
- 11 LAN protocols supported.

**CityNet annual operating budget: \$14.5 million.**

# Perception.



# Reality.



## (We should talk.)

The confusing jumble of resources you think you have, is, unfortunately, the confusing jumble of resources you actually have.

And while nobody can truthfully say it's easy connecting your PCs to these resources, there is a solution.

It's a robust, TCP/IP-based, PC networking software product called PC-NFS.<sup>®</sup>

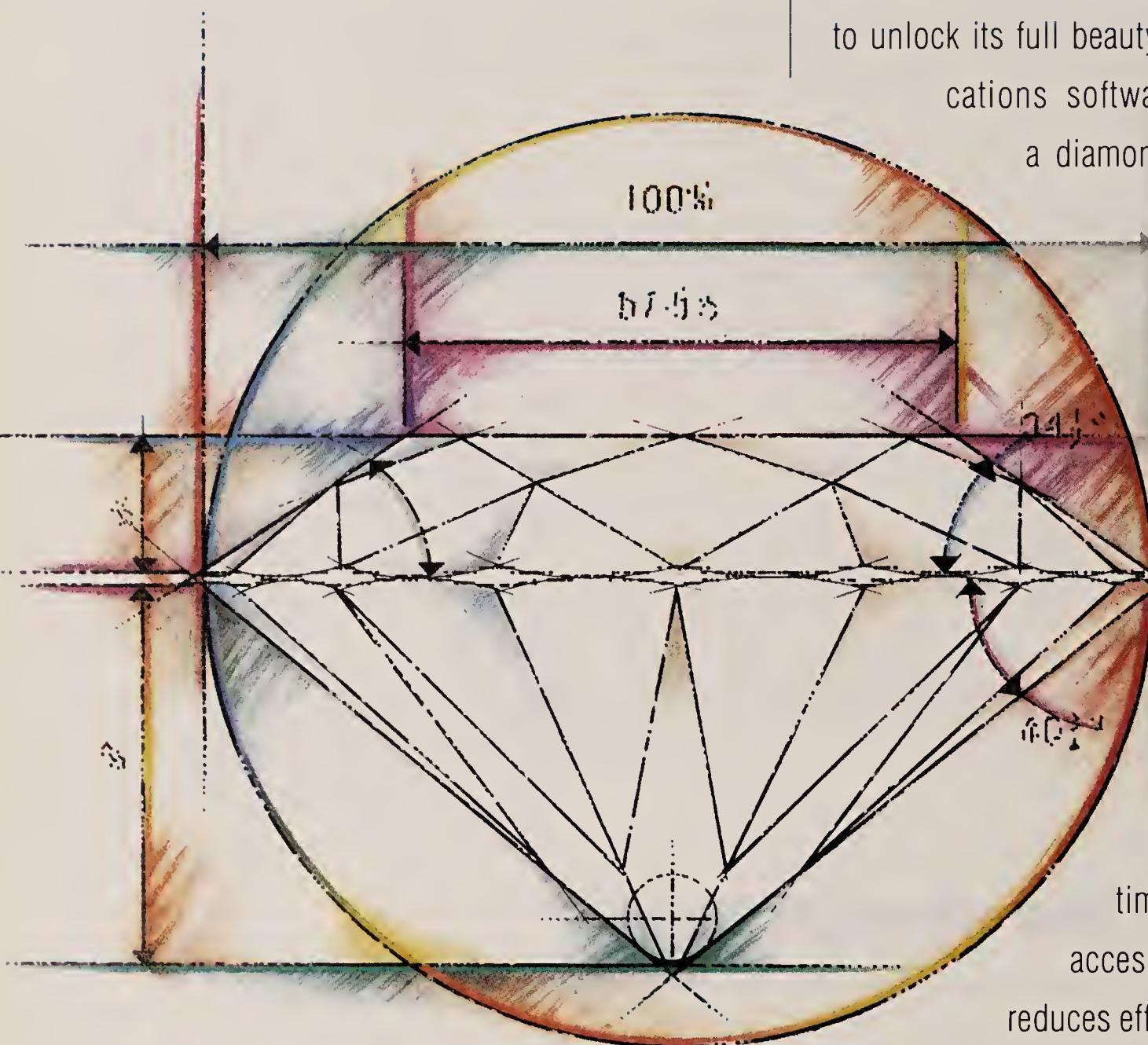
PC-NFS software allows you to connect not just a few PCs, but hundreds, or even thousands of PCs. To over 90 major platforms, including UNIX<sup>®</sup> workstations, VMS<sup>®</sup> and IBM<sup>®</sup> mainframes. With no gateways, bridges or routers. It supports key standards for multivendor network computing such as Sun's Open Networking Computing/Network File System (ONC<sup>™</sup>/NFS<sup>®</sup>) and TCP/IP. Giving you the most open and scalable network operating system for PCs on the market.

Today, more than one million people in major companies around the world are using PC-NFS to access corporate-wide applications, servers, printers, files, and storage devices—all without sacrificing their familiar MS-DOS<sup>®</sup> and Microsoft<sup>®</sup> Windows<sup>™</sup> environments.

So, if you are hearing a distorted view of reality from other vendors, give SunSelect a call at 1-800-24-SELECT. You'll change your perception of PC-to-enterprise networking forever.

 **SunSelect**  
A Sun Microsystems, Inc. Business

# Engineering brilliance for the integrated enterprise.



By design, the cut of the diamond is precisely engineered to unlock its full beauty and value. We engineer our applications software the same way. Like facets of a diamond, each SAP application gives you a precise view of your business information. Individually, they integrate functional needs. Combined, they integrate your enterprise.

SAP's multi-faceted, multi-functional, and multi-national software is engineered to streamline processes and improve quality, customer service, supply chain management, and time to market. Its single source data access uses resources more efficiently, reduces effort and maintains data integrity.

Whether you want manufacturing, financial, order management, distribution, or human resources software, SAP applications deliver competitive advantage. Find out more.

Call 1 (800) USA-1SAP.

SAP's engineering precision lets you leverage today's architectures and support the open systems of the future. The results are brilliant.



Integrated software. Worldwide. <sup>SM</sup>

SAP • Amsterdam • Atlanta • Brussels • Budapest • Chicago • Copenhagen • Heidelberg  
Hong Kong • London • Madrid • Milan • Paris • Philadelphia • San Francisco • Singapore  
Stockholm • Sydney • Toronto • Vienna • Zurich

# LAN, IBM shops team up to link SNA, Token Ring

By Joanie M. Wexler

If there is a trend in local-area networking companies today to rival Asynchronous Transfer Mode (ATM) rollout plans, it would be efforts to allow users to merge IBM host-oriented Synchronous Data Link Control (SDLC) devices onto Token Ring LANs, which are likely to be components of a multiprotocol backbone.

Last month, for example, router vendors Wellfleet Communications, Inc. and Proteon, Inc. both announced that they will resell SDLC-to-Token Ring protocol conversion devices from NetLink, Inc. in Raleigh, N.C. The conversion process allows SDLC devices to appear to both the network and the host as if they were natively LAN-attached.

Router vendor Advanced Computer Communications, Inc. is expected soon to announce that it will acquire NetLink competitor Ring Access, Inc. in Cupertino, Calif., to gain the conversion technology. Meanwhile, Cabletron Systems, Inc. announced at Networld Dallas '92 last month

## Router rivals unveil 3-phase ATM strategies

CONTINUED FROM PAGE 99

in Stamford, Conn. He added that if Cisco ends ATM development after the interface stage, its routers could eventually become feeder nodes into Wellfleet ATM backbones.

### Switch partnership

The Cisco/Wellfleet announcements came on the heels of a strategy outline by Proteon, Inc., which said the vendor would team up with business partners — whom analysts peg as likely to include Motorola/Codex — to develop a high-performance ATM switch that spans the local and wide areas in 1995.

Meanwhile, Proteon will add an ATM interface to its high-end router in late 1993 and in 1994 plans to deliver an ATM-compatible integrated hub-based router.

A hub-based ATM switching module is desirable to the user community, which is creating hub-centric networks, Patel acknowledged. However, he said, an outstanding question is whether to route within the hub. If not, and "you have 20 hubs feeding into a router, the router must handle higher speeds," as afforded by ATM.

McClimans said he anticipates a "big push during the next 12 to 18 months for ATM in campus networks."

Beyond that, he said he sees wide-area ATM services unfolding during the next two years, and "in five years, ATM will truly give Ethernet, Token Ring and FDDI a run for their money."

the conversion capability in the form of a module for its smart wiring hubs.

Last March, 3Com Corp. said it would be providing a stand-alone SDLC-to-Token Ring converter via a similar partnership,

though at press time no specific information or delivery dates were available.

However, Edgar Masri, 3Com's director of business development, said the firm believes the conversion reaps "higher performance and better IBM NetView management" when performed in a stand-alone device tied into a router, rather than via an integrated module in a hub or router.

**Efforts to merge IBM host-oriented SDLC devices onto Token Ring LANs rival ATM rollout plans**

Router leader Cisco Systems, Inc. has integrated its own SDLC-to-Token Ring technology into its internetworking devices, though some analysts said they believe LAN vendor partnerships with IBM Systems Network Architecture-focused vendors might deliver better products because of the niche companies' expertise with IBM technology.

THE GENIUS OF FLEXIBILITY™

“Our experience takes you inside OS/2.”

— Todd Bremner



**\$135** Full product or license  
**\$99** Upgrade from DOS

**Free**  
 with any OS/2 2.0 purchase: "Using OS/2 2.0" book from QUE Publishing.

IBM's OS/2 version 2.0, with its ability to support DOS™, Windows™, and OS/2™ applications is the multitasking environment PC users have been waiting for. Todd Bremner, our Product Marketing Manager for OS/2, says you can't beat the added advantage of our long-term experience with OS/2. We helped beta test 2.0, and our Liveware experts are already trained in its capabilities. Now, we've created the "Inside OS/2" program to offer you products and services that meet all your OS/2 needs. Add a terrific price and ready availability, and you can see that Corporate Software is the place to turn when you move to OS/2. Call today to place your order.

**Free Catalog**  
 of exciting offers on OS/2 products. Call (617) 821-4664, select option 9.

( 8 0 0 ) 6 7 7 - 4 0 0 3

CORPORATE  
SOFTWARE

UNITED STATES / CANADA / BELGIUM / FRANCE / GERMANY / UNITED KINGDOM

MasterCard, Visa, Discover and American Express accepted. Prices do not include applicable sales tax, handling and freight. Corporate Software Inc., 275 Dan Road, Canton, MA 02021. Prices and promotion available October 1, 1992 through December 31, 1992. Call for Canadian Pricing. All product names referenced herein are trademarks of their respective companies.

**The Added Advantage:**  
**Liveware.**™ Anyone can sell you software. Corporate Software offers you Liveware: people like Todd Bremner, who understand your company, not just your computer systems. Our Liveware can make the difference between owning a lot of software and using it productively. The Liveware side of software is available only from Corporate Software.





*SPARCcenter 2000. 2,190 MIPS.*

## **Introducing the server that will make you forget we even have workstations.**

*SPARCclassic. \$3,995.*



## **Introducing the workstation that will make sure that doesn't happen.**

The company that pioneered client-server computing has broken new ground again.

With a server expandable from a two-processor up to a 20-processor version that delivers more than 2,000 MIPS.

With a workstation that gives you full-color capabilities, 59 MIPS, and a price of \$3,995, fully configured.\*

Both computers have the SPARC® system and the Solaris® operating environment in common. SPARC is the only architecture that scales from notebooks to supercomputers. And the Solaris 2.1 operating environment, based on UNIX®, brings you symmetric multiprocessing, multithreading, improved security, real-time support, and a clear migration path to object-oriented computing.

You'll find more than 5,000 business and technical applications available on Solaris. And



by the time you finish reading, there's bound to be yet another application.

With the new SPARCcenter™ 2000 server you can continue all your rightsizing efforts. In fact, you'll perform a breathtaking 2,190 MIPS for compute applications and equally impressive performance for database applications.

You'll find a memory big enough to preserve your corporate memory, up to 5 GB of RAM. And a disk capacity that spans up to 1 TB. With all the high availability and management tools that you require. All for about the cost of upgrading your mainframe.

In addition, the SPARCcenter 2000 server gives you built-in hardware reliability. This lets you automatically reconfigure around failed processors, buses, and memory.

Sixteen thousand UNIX system experts help you integrate the new systems into your

existing environment. As well as educate and train your support staff. In short, we'll be there for you when you need us, 24 hours a day, 365 days a year.

If SPARCcenter 2000 is the ultimate server, SPARCclassic™ is the ultimate client. A true Sun™ workstation for just \$3,995, with 16 MB of memory, 207 MB of disk storage, and the intuitive graphical user interface OPEN LOOK®. Together, they make client-server computing more flexible and cost-effective than ever before.

If you can stand any more information today, call us at 1-800-426-5321, ext. 520. If not, call us tomorrow.



**Sun Microsystems Computer Corporation**  
A Sun Microsystems, Inc. Business



\*\$3,995 price for 12 or more. ©1992 Sun Microsystems, Inc. Sun, Sun Microsystems, the Sun logo and Solaris are trademarks or registered trademarks of Sun Microsystems, Inc. All SPARC trademarks, including the SCD Compliant logo, are trademarks or registered trademarks of SPARC International, Inc. SPARCcenter is licensed exclusively to Sun Microsystems, Inc. Products bearing SPARC trademarks are based upon an architecture developed by Sun Microsystems, Inc. All other products or service names mentioned herein are trademarks or registered trademarks of their respective owners.

## EO communicators herald new way of computing

By Michael Fitzgerald  
MOUNTAIN VIEW, CALIF.

The name EO, Inc. sounds like it could be the chant from a signature song for some Los Angeles band. But the company means all business, and it believes its new class of communication devices will begin to create what some call a new paradigm of computing.

"It's a whole new ballgame, similar to what happened when we shifted from the minicomputer to the desktop micro," Mark Cummings, analyst at SRI International, Inc. in Menlo Park, Calif., said of the 440 and 880 model personal communicators EO introduced recently.

The game shift comes from the communications-intensive nature of EO's products. This could lead to users' carrying them around and maintaining contact with their home office systems at all times, as well as being able to move data in true real-time fashion.

But EO's two personal communicators — the 2.2-pound 440 and the 4-pound, notebook-size 880 — represent a break from the desktop environment, which will likely slow their adoption.

The new products break with desktop computing in several ways: They are based

on a version of Go Corp.'s PenPoint operating system enhanced for better communications, they use AT&T's new Hobbit reduced instruction set computing (RISC) processor, and their emphasis is on communicating.

"EO, I think, is interesting because it's the first of a different species of systems," said William F. Ablondi Jr., an analyst at

BIS Strategic Decisions in Norwell, Mass. At the same time, he said, his interest lies more in EO's potential than its present, in part because its communications efforts are currently outstripped by more conventional products, such as Compaq Computer Corp.'s new implementation of a cellular modem in a notebook.

Analysts also said EO, Apple Computer,

Inc.'s RISC-based Newton and other products-to-be in this class give no clear indication of how they will really be used.

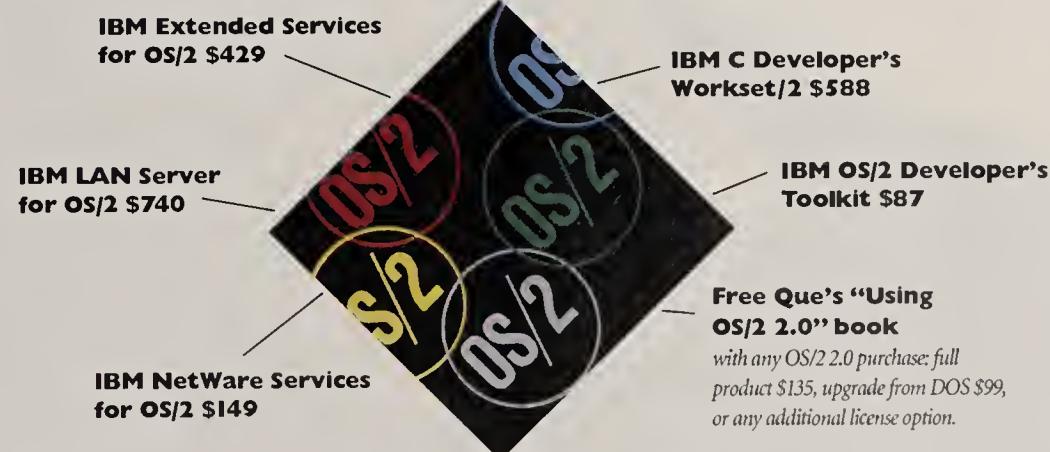
"We don't know yet what the new paradigm is," Cummings conceded. "We have a three-step process to go through — denial, then a phase where we implement the old paradigm with new computers, and then finally explosive growth, which is discovery of new paradigm."

Cummings said user companies are just now beginning to step into Phase 2.

# THE GENIUS OF FLEXIBILITY™

# "Tap into the power of OS/2 and Corporate Software."

— Raj Patel



These products from IBM truly leverage the power of OS/2™. And right now, Corporate Software is offering them to you at special prices. Raj Patel, one of our Technical Support Specialists, knows that whether you are developing 32-bit applications or implementing a client/server environment, these programs can help you take full advantage of OS/2's capabilities. Likewise, Corporate Software's expert services for OS/2 will provide the answers you need to maximize the potential of OS/2 2.0. To tap into the power, call Corporate Software today.

( 8 0 0 ) 6 7 7 - 4 0 0 3

CORPORATE  
SOFTWARE

UNITED STATES / CANADA / BELGIUM / FRANCE / GERMANY / UNITED KINGDOM

MasterCard, Visa, Discover and American Express accepted. Prices do not include applicable sales tax, handling and freight. Corporate Software Inc., 275 Dan Road, Canton, MA 02021. Prices and promotion available October 1, 1992 through December 31, 1992. Call for Canadian Pricing. All product names referenced herein are trademarks of their respective companies.

The Added Advantage:  
Liveware. Anyone can sell you software. Corporate Software offers you Liveware: people like Raj Patel, who understand your company, not just your computer systems. Our Liveware can make the difference between owning a lot of software and using it productively. The Liveware side of software is available only from Corporate Software.



### In Brief

**ServicePoint bought out**  
Network Computing, Inc. in San Jose, Calif., has acquired ServicePoint Development Corp. and integrated the ServicePoint automated help desk product into its LANAlert system management product suite. All employees at ServicePoint will be retained in their current positions, Network Computing said.

**BT to expand dial services**  
BT North America, Inc. has announced a multimillion-dollar plan to expand domestic and international dial services, supporting speeds of 9.6K bit/sec., to 329 additional U.S. sites during the next two years — up from 72 locations today. This will enable users to realize throughput increases of up to four times when compared with 2,400 bit/sec. dial-up, BT said.

**Novell tool for Ethernet**  
Novell, Inc. has announced a Microsoft Corp. Windows-based application for its NetWare Management System platform for centrally managing Ethernet wiring hubs that conform to the Hub Management Interface standard. The application is priced at \$995.

# "Why's Apple talking to me about UNIX?"



## Introducing MacX for Macintosh.

Because you probably didn't realize you can now run X Window System™ applications on a Macintosh.®

It's simple and it's inexpensive. And all you have to do is add MacX.™

MacX is a seamless extension of the Macintosh operating system that takes only a few seconds to install. It allows Macintosh computers to run X Window System applications concurrently in separate windows on the Macintosh desktop.

Actually, MacX is even better than that. It allows you to run Macintosh and X applications at the same time. And cut and paste informa-

tion between the two as easily as cutting and pasting between two Macintosh applications. Which means now everyone on your system can use the same X applications. Without anyone uttering a single word of confusion.

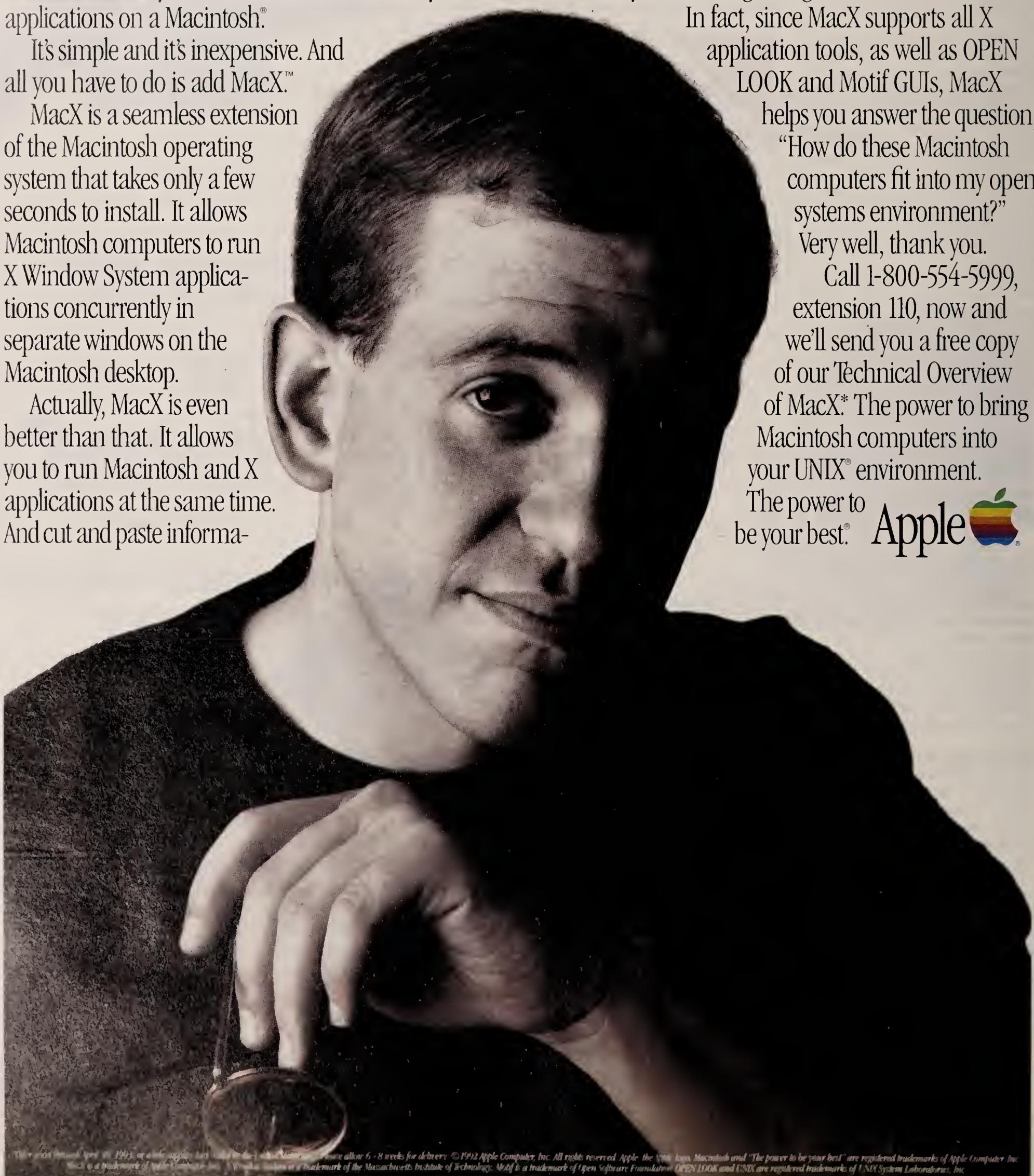
In fact, since MacX supports all X application tools, as well as OPEN LOOK and Motif GUIs, MacX

helps you answer the question, "How do these Macintosh computers fit into my open systems environment?"

Very well, thank you.

Call 1-800-554-5999, extension 110, now and we'll send you a free copy of our Technical Overview of MacX.\* The power to bring Macintosh computers into your UNIX® environment.

The power to be your best.® 



Allow 6-8 weeks for delivery. ©1992 Apple Computer, Inc. All rights reserved. Apple, the Apple logo, Macintosh and "The power to be your best" are registered trademarks of Apple Computer, Inc. Motif is a trademark of Open Software Foundation. OPEN LOOK and UNIX are registered trademarks of INX System Laboratories, Inc.

# Crosstalk for Windows 2.0 debuts

By Lynda Radosevich  
ALPHARETTA, GA.

Digital Communications Associates, Inc. (DCA) will roll out an updated version of Crosstalk for Windows asynchronous communications software later this month.

Crosstalk for Windows 2.0 adds new ter-

minal emulation and file-transfer protocols, DCA's scripting language and support for Microsoft Corp. Windows 3.1's Multiple Document Interface. Pricing is set at \$195; \$49 for users of previous versions of Crosstalk for Windows.

Release 2.0's support for Multiple Document Interface lets users open and run multiple communications sessions at the

same time, a Windows feature not supported in earlier versions of Crosstalk for Windows. Users can hide, resize and reduce the session windows to icons. A bar at the top of the screen provides icons that let users perform frequently used functions — such as sending and receiving files — with a mouse click.

A new "quick pad" utility lets users

place scripts, macros and frequently used keys on an on-screen pad that can be accessed using a mouse.

New file-transfer protocols give users access to IBM mainframes (FTTERM and INDSFILE), bulletin boards (ANSI and ZMODEM) and VAX minicomputers (Digital Equipment Corp. VT emulation and Kermit). Terminal emulation support includes DEC VT52, VT100, VT220, VT320, IBM 3101, FTTERM, HP-700, Wyse and others.

## LAN connectivity

CONTINUED FROM PAGE 99

router that will be installed at 12 geographic areas that have the highest concentration of non-SNA traffic, Carragee said. Those areas would include a geographic area, such as Forest Hills, and actual agencies, such as the New York Housing Authority.

The hub will combine a bandwidth manager, which will allocate channels on a T1 link among LAN, SNA and asynchronous devices, as well as fax and imaging devices, Carragee said. The router will provide interconnections for various agencies' LANs, while the X.3/X.25 packet assembler/disassembler will support asynchronous systems such as Digital Equipment Corp. minicomputers. A 3745 front end attached to an IBM host will coordinate the SNA traffic as a Communications Management Processor.

Carragee's group evaluated the idea of using SNA front ends to support LAN traffic but concluded that this design worked best in terms of guaranteeing service for existing SNA users, he said.

New York City plans to migrate its network to IBM's Advanced Peer-to-Peer Network (APPN) sometime after IBM VTAM 4.2, NCP 6.2 software becomes available next year, Carragee said. All front-end processors will eventually be APPN nodes, but "we expect it to be a long, complicated migration," he added.

Moving to peer-to-peer SNA will be less of a leap for the city given that it is already doing extensive low-entry networking over SNA backbones that link more than 160 IBM Application System/400s. The city began using IBM's low-entry networking Type 2.1 as soon as it became available, Carragee said.

New York City is currently committed to supporting 11 protocols, including IPX, Transmission Control Protocol/Internet Protocol, Banyan Systems, Inc.'s Vines, frame relay, X.25, Open Systems Interconnect and Digital Equipment Corp.'s DECnet.

The contract has yet to be awarded, Carragee said. The award is scheduled to be made at a public hearing next month.

The city uses IBM's Officevision but only as an E-mail platform for IBM VM systems, Carragee said. E-mail products from Banyan and Novell, Inc. are also used, as are CC:Mail and other E-mail products, which speak to each other over the SNA backbone using LU6.2 with SoftSwitch, Inc.'s Gateway performing connections and translation.

**"We're working together for greater productivity."**

— Karen Falcone



You haven't experienced how productive your desktop can be until you've run the OS/2™ versions of Lotus 1-2-3™, Freelance Graphics™, or cc:Mail™, says our Group Manager of Support Services, Karen Falcone. Combine our unbeatable experience with OS/2 and Lotus products with ready availability and special pricing and you have a smooth migration to a new era of productivity. Make your move today by calling Corporate Software.

**Free Catalog**  
of exciting offers on OS/2 products. Call (617) 821-4664, select option 9.

( 8 0 0 ) 6 7 7 - 4 0 0 3

**CORPORATE  
SOFTWARE**

UNITED STATES / CANADA / BELGIUM / FRANCE / GERMANY / UNITED KINGDOM

MasterCard, Visa, Discover and American Express accepted. Prices do not include applicable sales tax, handling and freight. Corporate Software Inc., 275 Dan Road, Canton, MA 02021. Prices and promotion available October 1, 1992 through December 31, 1992. Call for Canadian Pricing. All product names referenced here-in are trademarks of their respective companies.



## New Products

### WAN software

Frontier Technologies Corp. has introduced Super-NNTP for Windows.

The product was designed to enable users to access network news from a Microsoft Corp. Windows desktop.

Based on the Network News Transport

Protocol (NNTP), Super-NNTP provides client access to NNTP Servers that are located at most computer centers.

The product is used in conjunction with the company's Super-TCP for Windows 100% Dynamic Link Library Transmission Control Protocol/Internet Protocol connectivity software and offers a Local NNTP Server feature designed for custom filtering of incoming information, according to the company.

Super-NNTP for Windows costs \$95.

►Frontier Technologies  
10201 N. Port Washington Road  
Mequon, Wis. 53092  
(414) 241-4555

### Electronic data interchange

System Software Associates, Inc. has introduced EDI-SET, an electronic data interchange (EDI) product.

According to the company, EDI-SET was designed for developing trading partner-

specific interfaces between an application database and EDI messages. With EDI-SET, users can develop inbound and outbound message interfaces via "intelligent" file and field mapping to any IBM Application System/400 application database, the company reported.

The applications processing logic is copied to the interface program with an intelligent-copy feature, and EDI-SET automatically posts EDI messages to the application database.

Prices range from \$4,900 to \$50,000.

►System Software Associates  
500 W. Madison  
Chicago, Ill. 60661  
(312) 641-2900

### Gateways, routers, bridges

Cascade Communications Corp. has introduced Version 2.0 of STDX frame-relay switches.

New features include the RFC 1294 Gateway, a software-based function that permits multivendor routers that are incapable of supporting frame relay to connect to a frame-relay network, according to the company. A 30 Bundle E1 I/O module provides up to 30 High-Level Data Link Control data links on a single E1 line and supports E1 or fractional E1 interfaces, the company said.

A six-port Universal module is also offered that supports connections to a variety of popular synchronous interface connections.

Prices start at \$2,000.  
►Cascade Communications  
Unit #4  
239 Littleton Road  
Westford, Mass. 01886  
(508) 692-2600

Computer Mail Services, Inc. has introduced the M-Bridge gateway for Unix-to-MCI Mail.

According to the company, the product resides on a dedicated Microsoft Corp. Windows-based PC gateway. Support is provided for both message attachments and return receipts.

The product includes an M-Bridge nickname facility that offers Unix users more access to the more advanced capabilities of MCI Mail, including sending messages to nonelectronic recipients through fax and telex and the capability to access pre-registered graphics such as signatures and letterheads.

A primary license costs \$4,995.  
►Computer Mail Services  
Suite 300  
20300 Civic Center Drive  
Southfield, Mich. 48076  
(313) 352-6700



If you're considering a PC-LAN document imaging system for your firm, it can be very confusing. Now you can deal with one team of experts, supported by one comprehensive product line. LaserData. Our team designs, refines and installs every imaging system and component we sell. Our open architecture makes integration simple and easy, on your existing computer equipment. And our systems are modular and flexible, so you can add on when the time is right, with no fear of obsolescence. You get imaging that's reliable and profoundly compatible. With more than 1,000 systems installed in 30 countries, it's no wonder businesses and governments trust us. They like to keep things uncomplicated, too. Call or write us for more information. It's probably the most relaxing thing you'll do today.

LaserData is a registered trademark of LaserData, Inc., 300 Vesper Park, Tyngsboro, MA 01879 • 508-649-4600 Fax 508-649-4436

**LaserData**  
The choice is simple.

**SELL MORE  
PRODUCT.**

Advertise in Computerworld's  
Product Showcase. It works.

**800-343-6474**  
x744



## Customer reaction to slow online transactions is usually easy to gauge.

Online is your direct line to customers. A slow transaction slows down your business, reduces your ability to compete and can cost you customers.

How can you keep online transactions up to speed, and customer satisfaction up to par? With Application Performance Management.

It's a new discipline that lets IS departments in MVS mainframe environments improve performance at every stage of an application's life — from design and development, to QA, production and maintenance.

*(APM can even help enhance the viability of legacy applications and preserve your investment.)*

To take advantage of APM, you need *STROBE*<sup>®</sup> and *APMPOWER*<sup>™</sup> from Programart<sup>®</sup>.

For a free demonstration of how APM can help you improve application performance, call us at **800-472-2923** — before you and your customers really get steamed.

**PROGRAMART**  
CORPORATION

# Multivendor networks.



## Getting all the beasts to

The trouble with computer networks is they come in so many different species, which, as you may know, don't always get along. Conflicts between networks can turn your business into a real zoo.

Things got this way because networking products evolved on separate paths, for reaching different goals. But today's goal is to pull things together, and nobody can help you do it better than IBM.

We've not only built more networks than anyone (over 200,000), we've built all kinds. And we support all the leading standards, not just with words, but with solid products and services. (Ironically, while some



## behave takes real expertise.

still think of TCP/IP as a "non-IBM" standard, we offer as many TCP/IP products as anybody.)

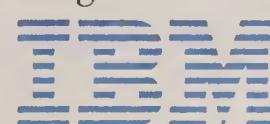
So if you have a DEC® system in one department, Appletalk® in another, IBM checkout lines in your stores, and a supplier using UNIX® workstations, we can make them all work together. And not by patchwork, either. IBM's new router technology is straightforward and fits naturally with your existing investments.

And to give you more freedom in the future, we're forming numerous alliances with our competitors. You want products that communicate after you buy them, so we're talking to each other now.

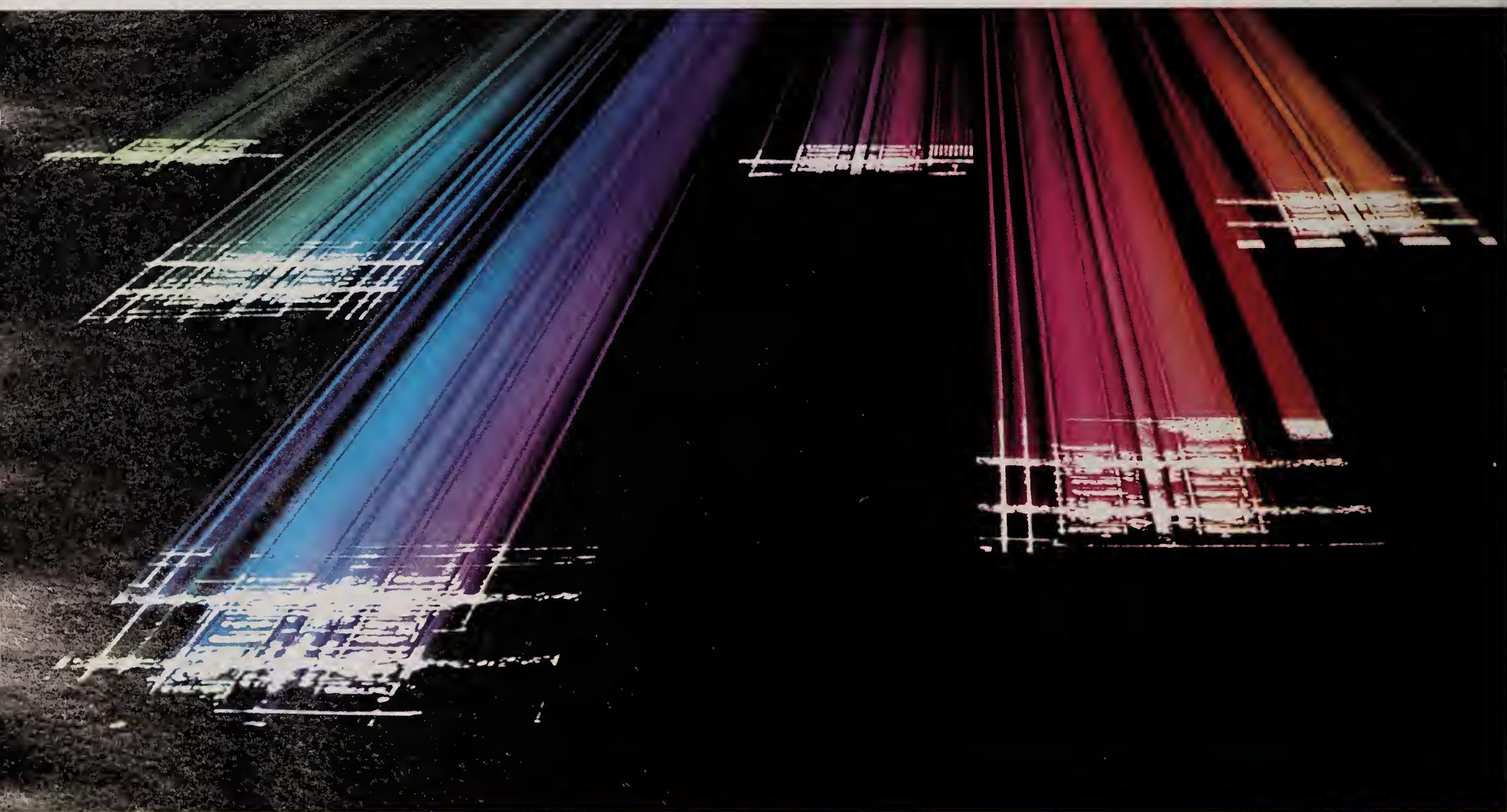
What's more, we'll not only integrate your networks, we'll stay on to manage them for you, if you like.

For Caterpillar, IBM NetView™ is managing *fifteen* different kinds of networks as if they were one. And for ADC® Telecommunications, we're designing a network of IBM mainframes, PS/2®'s, Mac®'s and DEC VAX®'s, plus Sun® and HP® workstations, using such diverse protocols as SNA, TCP/IP and Appletalk, all connected over Ethernet and Token-Ring.

We can perform similar feats for you, but only if you call us. At 1 800-IBM-6676, extension 725.



# If you think getting 25 gigabytes on one cassette tape is impressive, wait 'til you see how fast you can access it.



Now, there's a high-performance mass storage solution that can keep up with your mind. It's called EMASS™ mass storage. It's based on a technology called helical scan. And it's about to change the way you look at your data.

At speeds five times faster than any other mass storage technology, EMASS systems put your information on-line at a breakneck 15 megabytes per second. In short, that means you can access any file from your multi-terabyte mass storage system before you can finish reading this ad.

What's more, EMASS systems house up to six terabytes in a trim 27-square-foot space — with a lean per gigabyte media cost of under \$2. Hardly a comparison to other technology that takes up 500 times more space and

costs \$73 more per gigabyte. All the same, we thought you should know.

We're the EMASS Group, a part of a Fortune 500 company called E-Systems, open on all UNIX-based systems and available now. To learn more, call 1-800-OK-EMASS today, or write: P.O. Box 660023, Dallas, Texas 75266-0023. When it comes to storing and retrieving your information, we're light-years ahead.

**EMASS**  
GROUP

A Part Of E-SYSTEMS, Inc.

The Power Of Information Is At Hand.

Visit us at Supercomputing '92, Booth #104.

## DB2 conversion simple if you're prepared for it

By Johanna Ambrosio

■ **Converting to the most recent release of DB2 is pretty much a simple matter, according to some users who have done it. But that is assuming the shop is up to date on its maintenance releases and is using the catalog correctly. Otherwise, the job can be much more painful.**

IBM announced the most recent DB2 release, 2.3, in September 1990 and delivered it in December 1991.

About half of the 6,000 or so DB2 customers are using the current release, analysts said.

Spiegel, Inc. finished converting its major production applications last March, according to David Beulke, senior software specialist. After some initial bugs in the beta-test version that were fixed in the general release, "everything went smoothly," he said.

The company has some 80G bytes of data on Release 2.3, Beulke said, and has noticed a performance improvement of about 5% to 10% with the new release.

Although Spiegel hit no major snags once the general release was available, other shops have not been so lucky. The problems have not been because of the software but be-



cause users in some cases have not implemented all of the maintenance tapes associated with Release 2.2.

Another issue is how people have implemented the DB2 catalog in Release 2.2.

"If people have not paid attention to what they were doing in 2.2, then 2.3 can be difficult because errors will come up," said Shaku Atre, president of consulting firm Atre, Inc. in Rye, N.Y. "You have had to enter things into the catalog properly in 2.2, with business rules and referential integrity."

Assuming all that has been done correctly, "2.3 is not a major problem," Atre said.

Bi-Lor, Inc., a retail grocer in Mauldin, S.C., is going through the conversion now to try to tap into some of the performance gains from Release 2.3, according to Don Parrott, software systems specialist.

They are finding it "a pretty substantial effort," he said, "because we weren't up to the current maintenance level. We have had to bite the bullet and put two years of maintenance in."

Generally, Parrott said, "we like to keep more current, but we're running lean and mean on staff, and some things just got put off."

Other than that, he said, judging from the other users he has talked to, "it's pretty cut-and-dry."

## Life after statistics

SAS Institute goes beyond original offerings, challenges Cobol

By Gary H. Anthes

SAS: It's not just for statistics anymore.

In fact, it has been quite some time since products from SAS Institute, Inc. were solely for statistical applications, but some people just don't get it, the company complained.

Founded by statistics professor James Goodnight and three others, the company had just one product in 1976—the Statistical Analysis System for IBM MVS mainframes. That product survives today in the form of a SAS/Stat, one of 28 SAS products in 5.5 million lines of source code for 20 operating systems.

SAS now says it is in the business of "information delivery" and offers software for application development, executive information systems (EIS), spreadsheets, data entry, project management, computer capacity planning, host-to-host data transfer and dozens of other functions.

"As the number of customers grew, they began asking for a lot more capabilities — reporting, graphics and general-purpose data processing capabilities," Goodnight said. Now, he said, SAS can do almost anything, and at the SAS Institute in Cary, N.C., it does (see story page 117).

While SAS has deployed its own products wider and deeper than most of its 3 million customers, some users have found that the SAS System

for Information Delivery can replace much of what has traditionally been done in Cobol, with a big boost in programmer productivity and a modest — if any — penalty in processing efficiency.

Associated Insurance Cos. in Indianapolis has an array of SAS products installed on IBM mainframes and DOS-based PCs. Actuaries at the company began using SAS 13 years ago for statistics.

Now, in one key application, it summarizes huge databases of health claims; it extracts, manipulates and analyzes data and then generates reports highlighting things such as questionable claims or excessive charges.

"We were a Cobol shop, but I started doing things in SAS," said Diane Brown, a former actuary and now data systems manager in the Administar unit of the insurance company. "I was getting real productive and people were looking at me and wondering."

According to Brown, the attitude used to be, "real programmers don't use SAS," but that has changed. "Today there is no prejudice against SAS by our systems people. In fact, we use it more than the end users."

A staff of five SAS programmers has put into production some 500 programs that process 100 million claims records a year, Brown said. Advantages of SAS include gains in application development productivity and its great power to ma-

SAS, page 117

Across the spectrum		
SAS products worldwide as of 11/5/92		
	Installations	Total product licenses
<b>MVS</b>	5,937 MACHINES	25,992
<b>CMS</b>	1,521 MACHINES	7,601
<b>VAX</b>	3,196 MACHINES	15,374
<b>MS-DOS</b>	9,000 SITES	33,756
<b>OS/2</b>	1,428 SITES	7,383
<b>Unix</b>	2,896 SITES	15,109

Source: SAS Institute, Inc.

## E-Mail = Emc<sup>2</sup>/TAO LAN

You've known Emc<sup>2</sup>/TAO for the mainframe for years — and now it's available for the LAN. Emc<sup>2</sup>/TAO LAN offers the same features and functions as Emc<sup>2</sup>/TAO on the mainframe — but with the sizzle of Windows on the desktop.

Emc<sup>2</sup>/TAO LAN is very well connected. It's the only LAN E-mail product offering totally seamless integration with its mainframe counterpart. That means central directory administration, centralized gateways, and scalability. In short — a comprehensive enterprise solution.

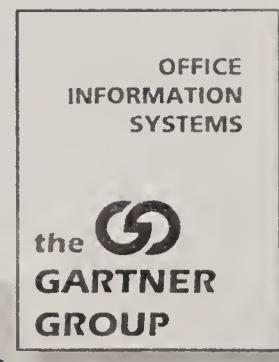
*Emc<sup>2</sup>/TAO*



4073 Merchantile Avenue, Naples, FL 33942  
(813)643-1500

For your free copy of The GARTNER GROUP's Research Note on Emc<sup>2</sup>/TAO, call toll free

1-800-237-4510



# Our Parallel Proce Database Inquiries Fr



# Processors Cut Complex Commissions To Minutes.

## Putting Together Mission-Critical Information Faster.

Fast access to enterprise information can provide a powerful competitive weapon for your organization. But getting mission-critical information from conventional mainframe relational databases is very time-consuming and costly.

Our lead in parallel processing technology gives the NCR System 3600 computing power the traditional mainframe can't match. Actual customer benchmarks show the System 3600 offers order-of-magnitude improvements in response times for database inquiries. From hours to

minutes. Timely information to help you outpace your competition and provide better service to your customers.

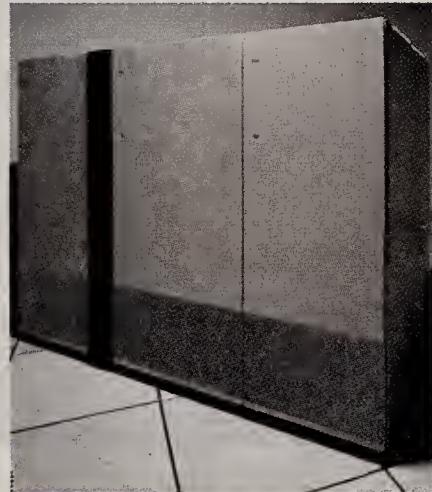
Gains can be realized by moving database-intensive applications—on-line transaction processing or expert systems—off your mainframe. Conventional mainframes don't have the power to handle large database queries that provide timely information to your business. While the

NCR System 3600 was designed to facilitate them.

Another approach is to off-load your mainframe database to our System 3600. This approach can improve inquiry response while freeing your mainframe for more suitable tasks.

The System 3600 is part of a scalable family based on cost-effective microprocessor technology that extends from portable PCs to a future enterprise system offering over 100,000 MIPS. And since System 3600 connects to your current computing environment, you can preserve your investment in proprietary systems while you move toward a more flexible, open future.

For more information on NCR's open enterprise system, phone 1 800 CALL-NCR.



**NCR**  
An AT&T Company

Open, Cooperative Computing.  
The Strategy For Managing Change.

# Chicago library stays on-line

By Ellis Booker  
CHICAGO

Visitors entering Chicago's year-old Harold Washington Library Center are sure to be impressed by the splendid architecture of the 10-story building, with its terrazzo and marble floors and its plaster, marble

and maple walls.

But when Ulo Ormiste, director of computer services at the City of Chicago Public Library, looks at the building, he is more likely to see an institution that handles thousands of on-line transactions.

From Ormiste's perspective, this library looks like a bank, and like a bank it needs

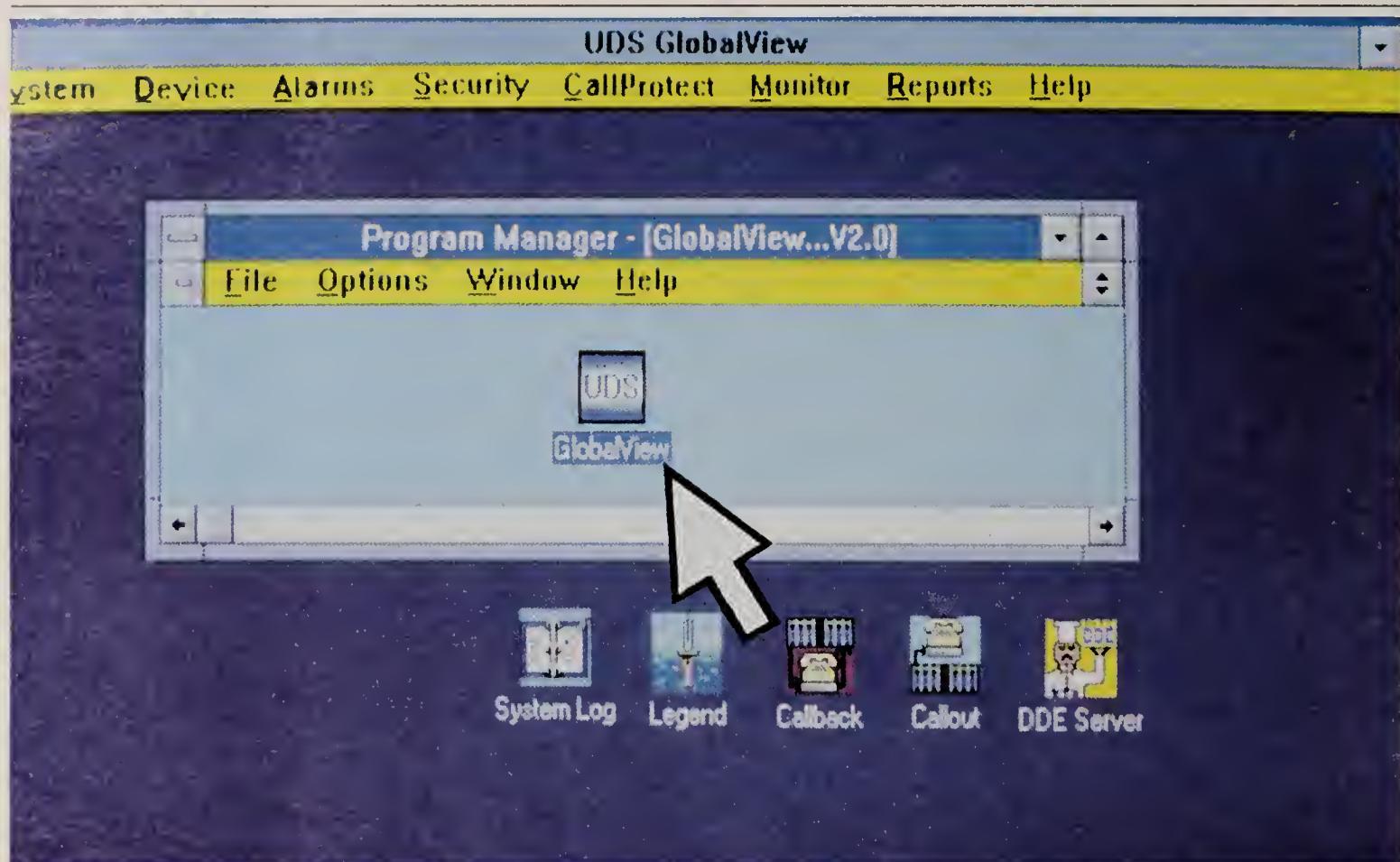
a fault-tolerant host in its data center.

For this reason, two of the library center's most mission-critical applications — the on-line card catalog and the book check-in/checkout system — run on a Tandem Computers, Inc. Cyclone processor. The Tandem sits a couple of miles away at the library's data center and is connected

via two T1 lines.

"The check-in/checkout is almost an automated teller machine [ATM] transaction, but the delivery of information is a bulk file transfer. That's a problem for integrated library systems," Ormiste said. These functions are segregated on the Tandem system, which handled about 40 million transactions the first year, he said.

Another key aspect of the Tandem, according to Ormiste, is its fault-tolerant, nonstop features. Using the bank ATM



<h2>ON SITE</h2> <h3>Chicago Public Library</h3> <p><b>Challenge:</b> To keep two of Chicago Public Library's most important and public on-line applications available on a full-time basis.</p> <p><b>Technology:</b> A fault-tolerant computer from Tandem Computers, Inc. installed in a data center a few blocks away.</p> <p><b>Result:</b> Now in its third generation of Tandems, the library is moving administrative applications, currently running on the city-owned IBM mainframe, to the Tandem system.</p>	
--	--

analogy again, Ormiste said he wants his card catalog terminals to be available to library visitors full time.

In addition to the Tandem, the library uses a Wang Laboratories, Inc. VS 5000 as a front end to an IBM mainframe for its personnel, financial and book-ordering systems. The IBM host, run by the city, resides in Daly Center, across from city hall.

The library, which began using Tandem machines in the early 1980s, plans to move its book acquisition module onto the Tandem. Unlike some other users, however, Chicago's library system is not exploring a client/server migration for its critical applications.

"The problem is, we have 82 physical locations around the city, and you can return a book or pay a fine at any one of them," Ormiste said. "Inventory and customer records have to be available to every location."

The library is using high-speed networking solutions to address the needs of its main and remote locations. About 200 on-line card catalog terminals are connected over a 9.6K bit/sec. twisted-pair network to a StarMaster data switch from Gandalf Systems, Inc.

From there, this traffic is carried on one of two T1 lines to another Gandalf switch at the library data center, where it is sent into one of 20 X.25 packet assembler/disassemblers (PAD) attached to the Tandem. Each PAD supports 48 terminals.

Library users can also dial into the catalog remotely through an Illinois Bell node, which hops the call onto an Integrated Services Digital Network B channel running at 2.5K bit/sec. Like the library terminals, up to 48 of these calls can feed into a single X.25 PAD on the Tandem.

# “CLICK”

## The sound of simplified dial-up network management



**GlobalView**, the network access management system from UDS, gives you the mousepower to manage your dial-up datacomm network from a single location.

With the easy-to-use, Windows-based software, you can control, monitor, test,

configure, secure, log, report, track, review, diagnose and audit hundreds or even thousands of modems on your network.

GlobalView is simply the simplest, most efficient dial-up network management system on the market. To make it click for your systems, phone:

**800-451-2369**



*Quality Means The World To Us.™*

## SAS: Life after statistics

CONTINUED FROM PAGE 113

nipulate files, Brown said.

At CitiBank Telemarketing Services in Baltimore, SAS/Stat has been used for years for forecasting, market analysis and credit analysis. Now the company—which sells credit cards and financial services for parent CitiBank NA—is using SAS products to develop an EIS to measure the effectiveness of the bank's marketing programs and telemarketing staff.

Kevin Kramer, director of information services, said the EIS, which he prefers to call "Everybody's Information System," summarizes the results of 1 million monthly telephone calls and produces reports and on-line files for graphical display. It re-

places a process in which data printed out from the minicomputer-based telemarketing software was keyed back into PC-based spreadsheets.

"We had a potpourri of ad hoc solutions," Kramer said. "We saw we needed to get our act together and come up with

an integrated, holistic approach."

Kramer agreed that SAS has a bit of an image problem. "It's the name—Statistical Analysis System," he said. "But when you begin to explain to people all the other modules that exist and all the things it can do—access data, report it and manage it—it opens people's eyes."

Xerox Corp.'s Occupational Health Information System is written in SAS from stem to stern. SAS handles the data entry and validation, database management,

analysis and reporting. The system measures and analyzes employee health and workplace conditions.

Anne Stocum, a systems analyst in Xerox's Corporate Strategic Services Division, said the company considered putting the application up with Cobol and DB2. But she said Xerox was committed to using SAS for the statistical chores in the application, and the company found SAS could handle the data entry and database functions as well.

## Proof that SAS software works

Software firms sometimes liken themselves to the cobbler's barefoot children, sheepishly acknowledging that their own internal systems are not quite state of the art.



**Jim Goodnight:**  
Cobol not needed at SAS

But SAS Institute has made its systems a showcase for its products. Cobol programmers need not apply at SAS.

"We are estimating revenues this year of \$350 million, and we run the entire company with

SAS—payroll, accounts payable, accounts receivable, the human resources database and sales support systems," said SAS President James Goodnight. "We do a lot of reporting in SAS, and my EIS is done entirely in SAS."

Goodnight said SAS provides a good database environment for holding data for analysis but may not be ideal for high-volume transaction processing applications. However, he said, many people buy expensive database management systems for chores that could be handled quite nicely with far less expensive SAS solutions.

## DO YOU SELL OUTSOURCING?

Advertise in Computerworld's Time and Services Classifieds. They work.

800-343-6474

x744



### Find out how, free.

Now you can get all the information and products you need to implement client-server solutions on Windows® and NetWare™. Today. From Gupta, the leader in client-server database software for PC networks.

*"Gupta had the key products we needed to implement client-server applications successfully on NetWare and Windows. Anyone serious about client-server should look at Gupta."*

**Ira Morrow, Vice President, Technical Planning, Shearson Lehman Brothers**

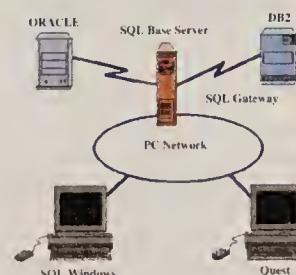
### SQLBase® The fastest database server for PC networks.

For NetWare, there is no faster or more cost-effective server than SQLBase. It delivers over 100 transactions per second. It's easy to install, configure and administer as a NetWare Loadable Module (NLM). And it provides features such as scrollable cursors and referential integrity that are critical requirements for interactive, graphical applications.

### SQLWindows® The leading graphical development tool.

Unlimited application-development power with graphical PC convenience. That's SQLWindows, the graphical

4th-generation language (4GL). SQLWindows is used by more programmers worldwide than any other software to create "industrial strength," mission-critical applications under Windows. SQLWindows includes such essentials as a graphical forms painter, an integrated debugger, a comprehensive report writer and an automatic application generator. And we offer a unique



*Gupta offers all the products you need—graphical tools, SQL database servers, and connectivity software—to implement client-server database applications on NetWare or across your enterprise.*

custom data-access environments. And Quest requires no knowledge of SQL.

### SQLNetwork™ Client-server connectivity across your enterprise.

Only SQLNetwork makes all popular SQL databases—on mainframes, minis and PC networks—accessible to NetWare PC applica-

## How to put client-server to work on NetWare.

application-registration program that eliminates the need to pay run-time fees upon deployment.

### Quest® Fast answers to difficult questions.

Quest is the easiest and most versatile end-user database tool available under Windows. Use Quest to quickly query data from all popular SQL databases such as SQLBase, ORACLE® and DB2. Only Quest includes an integrated graphical report writer anyone can use to produce custom hard-copy reports. You can even integrate Quest via DDE with other Windows applications such as Excel to produce

tions. So you can use SQLWindows, Quest, or other applications to extend client-server throughout your enterprise.

### Gupta and Novell put client-server to work for you today.

Over half the Fortune 500 companies have selected award-winning products from Gupta to build graphical client-server applications. Whether you're downsizing, upsizing or implementing cooperative processing across your enterprise, Gupta and Novell can put client-server to work for you today. Call now for your free client-server information kit.

**FREE client-server kit.  
Call now 1-800-388-4550  
ext. GF01**

**Gupta**

*Putting PC Client-Server to Work.*

1060 Marsh Road, Menlo Park, CA 94025

(415) 321-9500, FAX (415) 321-5471 Gupta Europe 44 628-478333

SQLBase, SQLWindows and Quest are registered trademarks

and SQLNetwork is a trademark of Gupta Technologies, Inc.

NetWare is a registered trademark of Novell, Inc. All other

trademarks are the property of their respective holders.

© 1992 Gupta Technologies, Inc. All rights reserved.

CALL NOW 1-800-388-4550



*Model 715/33 • 46 SPECmark89 • 24.2 SPECint  
45 SPECfp • 15" color • 16MB diskless  
1 EISA slot (optional) • \$5,695*

*Model 715/33 • 46 SPECmark89 • 24.2 SPECint  
45 SPECfp • 19" color • 16MB, 525MB  
1 EISA slot (optional) • \$9,995*



Model 725/50 • 69 SPECmark89 • 36.5 SPECint  
72.1 SPECfp • 19" grayscale • 32MB, 525MB  
4 EISA slots • \$17,895

Model 735 • 147 SPECmark89 • 80 SPECint  
150.6 SPECfp • 19" color • 32MB, 525MB  
1 EISA slot • \$37,395

Model 755 • 147 SPECmark89 • 80 SPECint  
150.6 SPECfp • 19" color • 64MB, 2.0GB  
4 EISA slots • \$58,995

## What can you do after making the world's best performing workstations? Do it again.

When you're hot, you're hot. And our new generation of HP Apollo 9000 Series 700 workstations sizzles. With performance far ahead of anything else on this or any other known planet. But at extremely down-to-earth prices.

Our new generation PA-RISC is the catalyst for the latest advances. Providing a color entry-level system with phenomenal performance for just \$5,695. 3D graphics available

across the entire product line, even the low end. And a breathtaking 147 SPECmarks at the high end.

Think for a moment what all this could do for you. Then don't waste another moment before calling **1-800-637-7740, Ext. 7170**. We'll give you an encore dramatically better than the original performance.

# Unix drives airport transition

By Mark Halper

DALLAS/FORT WORTH, TEXAS

At the Dallas/Fort Worth International Airport, a forthcoming cut-over from an aging IBM System/38 to a Pyramid Technology Corp. multiuser system running Unix is revolving heavily around integration issues.

It was an integration problem in the first place that caused the airport to start looking for an alternative to the System/38 in the spring of 1991. The airport had, since it opened in 1974, added a host of applications to the system, few of which communicated easily with others such as the core financial programs for which the system was originally purchased.

"The staff was spending 75% of its time just maintaining the interface of software packages and only 25% of its time developing," recalled David Dearth, director of systems and technology management. He joined the airport a year before it issued its first of two requests for proposals (RFP) regarding the overhaul.

## Expanded core

Software, including work order processing, payroll, purchasing and inventory, had all been added to the core financial systems, which included general ledger, accounts payable and accounts receivable.

"Those needed a great deal of customization. We were pretty much in a maintain situation," Dearth said.

In issuing its first RFP, the airport

was looking not so much for savings as for a technology that would help the airport—which claims to be the world's second-busiest airport based on total passengers—to continue to expand, Dearth said.

The first RFP contained about 2,000 specifications, including databases and tools. It narrowed finalists down to a mainframe system proposed by American Management Systems and an Oracle Corp. system pitched on a Digital Equipment Corp. VMS or Unix platform.

The airport chose the Oracle system—the platform decision was to come later. An Oracle solution would be built around the Oracle database, tools and applications, whereas a mainframe approach would have been more hardware-driven.

"Oracle had a better fit in terms of actually meeting our requirements without modifying their package," Dearth said, noting that some of the Oracle applications required little or no tweaking.

Pricing was not the principal criterion, but lower costs vs. a mainframe approach weighed in Oracle's favor, Dearth noted.

A second RFP, in August 1991, involved choosing the hardware platform. It was during this process that the airport had to decide if it wanted Unix or VMS to drive its business.

"We struggled over the issue of how open we really wanted it to be," Dearth said, recalling that the airport had some of the usual concerns of commercial users about Unix. "We wondered about its security, its



David Dearth: Oracle had a better fit

reliability and its crypticness."

An industry movement toward Unix standardization raised the airport's comfort level, Dearth said, noting, "We think that Unix is going to mature, going to get better."

Unix, Dearth claimed, allows a user to pull out the hardware if a machine does not work out and is better suited to provide "the horsepower you need for relational performance."

## Close competition

Four bidders in addition to Pyramid responded: Sequent Computer Systems, Inc., AT&T, Data General Corp. and Hewlett-Packard Co. Dearth said pricing was "extremely competitive," and all the bids came in at close to the same level.

"A lot of them thought DFW was a site they could use to market to other municipal clients," he observed.

When it came down to choosing a finalist, "one of the things that was most important was the relationship with Oracle—where they sat in the porting schedule with Oracle," Dearth said. Pyramid and Sequent outperformed the others on that count. Pyramid held the final advantage of being Oracle's development platform for government Unix financial software.

The airport has two Pyramid machines in-house: One will be the production system and the other a development system. The Pyramid production system is a four-processor Model MIS 12; the development system is a two-processor Model MIS 12.

## ON SITE

### Dallas/Fort Worth International Airport Texas

**Challenge:** To plan a system to carry management of the airport into the next century.

**Technology:** Pyramid Technology Unix systems running Oracle DBMS, tools and applications replace IBM System/38.

**Benefit:** Integration of applications should be easier than under the System/38 environment.

# In Brief

## System/88 deal lives

IBM and Stratus Computer, Inc. recently announced that they will extend their OEM arrangement for IBM to distribute the IBM System/88 platforms, which are based on Stratus fault-tolerant computers.

## Outsourcing for Prime users

Denver-based Gemisys has jumped into what it sees as a void left by the troubles of Prime Computer, Inc. Gemisys plans to provide outsourcing services to users of Prime minicomputers by offering access to Prime platforms at Gemisys' data center. Gemisys claims its service will allow Prime users to retain applications based on Prime's proprietary architecture without new hardware.

## NY Life buys into vendor

A subsidiary of New York Life Insurance Co. has picked up a cooperative processing-based securities management software package by buying an 83% stake in software supplier Magnus Software Corp. in Marietta, Ga. The subsidiary, NY Life, Inc., had previously used the Magnus securities management software. NY Life officials said they hope to make Magnus software a standard in the insurance field.

## Michigan to use Unisys gear

The state of Michigan recently signed Unisys Corp. as its supplier for a \$60 million client/server-based system to automate management of a welfare program. The networked system will use two Unisys 2200/644 mainframes, 144 Unisys U6000 Unix servers and 6,200 PCs.

## Siemens picks Veritas system

Systems maker Siemens/Nixdorf Informationssysteme AG recently signed an agreement to use Veritas Software Corp.'s Veritas File System as a storage management product within the Siemens/Nixdorf Sinix operating system.

# Relief organization adopts database tool

By Mitch Betts

MISSISSAUGA, ONT.

**World Vision Canada refuses to sell its database of donors to the direct marketing industry out of respect for donor privacy.**

For World Vision Canada, the economic recession has meant a dramatic drop-off in charitable donations to the international relief organization. So the last thing it needs to do is annoy donors with too many mailings and impersonal pitches.

As a key part of its move toward more selective and personalized mailings, World Vision Canada has acquired a software package, called MarketPulse, that was designed especially for database-driven marketing campaigns. The vendor is MarketPulse, a Cambridge, Mass.-based subsidiary of Praxis International, Inc.

With the software, which runs on an IBM 4381 mainframe, World Vision Canada will be able to identify, for example, donors who prefer to give to relief efforts in Ethiopia and those who never respond to follow-up mailings, according to Peter Ward, director of donor research.

About 85% of the charity's income comes from people who "sponsor" a starving child they have seen on World Vision's television specials. But the list of donors has a high attrition rate, Ward said, because the donors either lose interest or become annoyed by repeated fund-raising appeals.



World Vision Canada needs to raise more money for its relief efforts

tapes of World Vision's own database. "We were overwhelmed by how easy it was to select categories of donors and how easy it was to use. We didn't want something that would be intimidating," he said.

World Vision Canada is in the process of moving its database from the mainframe to an IBM Application System/400, but MarketPulse will continue to reside on the spare mainframe and will extract data from the AS/400.

WHEN YOU DEMAND  
THE MOST ADVANCED  
CLIENT/SERVER DATABASE  
SOLUTION, YOU ONLY HAVE  
TWO CHOICES.

ORACLE7

CINCOM SUPRA® SERVER

YOU SHOULD LOOK AT BOTH.  
CLOSELY.

To Find Out More, Call 1-800-543-3010 Today.  
Outside The U.S., Call 1-513-662-2300.

 **CINCOM**  
The Smart Choice™

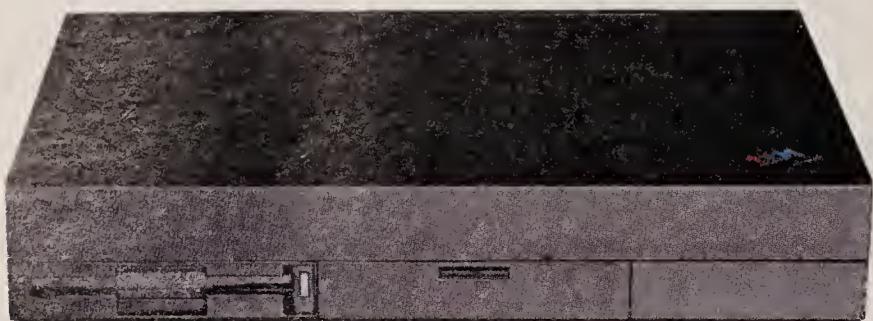
Don't  
miss our FREE  
SUPRA Seminar Series  
**"Beyond Client/Server:  
Thriving In The 90s."**

Call 1-800-543-3010  
for cities and  
dates.

© 1992 Cincom Systems, Inc. All rights reserved. Cincom, the Cincom logo, SUPRA, and The Smart Choice are registered trademarks of Cincom Systems, Inc.

As they say, it's all in the genes. Introducing the ThinkPad™ from IBM. The sleekest, sleekest little number that ever crunched one. A mere seven-and-a-half pounds of brains and beauty that just begs you to take it anywhere. And once you own one, that's exactly what you'll do.

The top-of-the-line ThinkPad 700C sports a



← All this in only 11.7" →

## Introducing ThinkPad

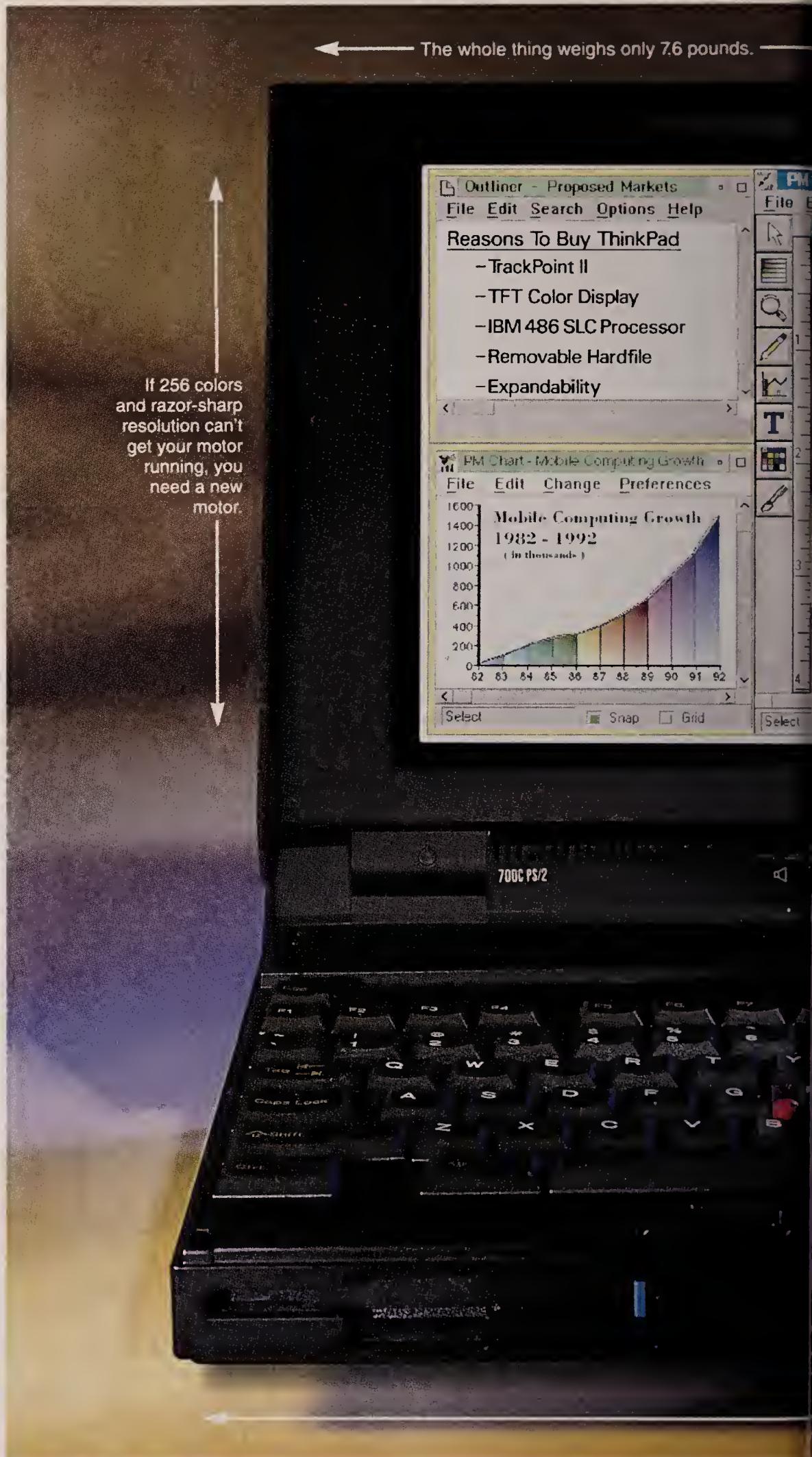
screaming 486 SLC™ 25 MHz upgradable processor. But it's built for comfort too. There's a surprisingly roomy interior, with a full-size, ergonomically designed keyboard. And a screen that literally bends over backwards (180 degrees, to be precise).

Strategically placed on the keyboard is a little red spot called the TrackPoint II.™ It does what a mouse would do with a few million more years of evolution. Nothing dangles; it's part of the soul of the machine. You can operate it with one fingertip. And it allows you to think on any terrain, even one without any flat surfaces.

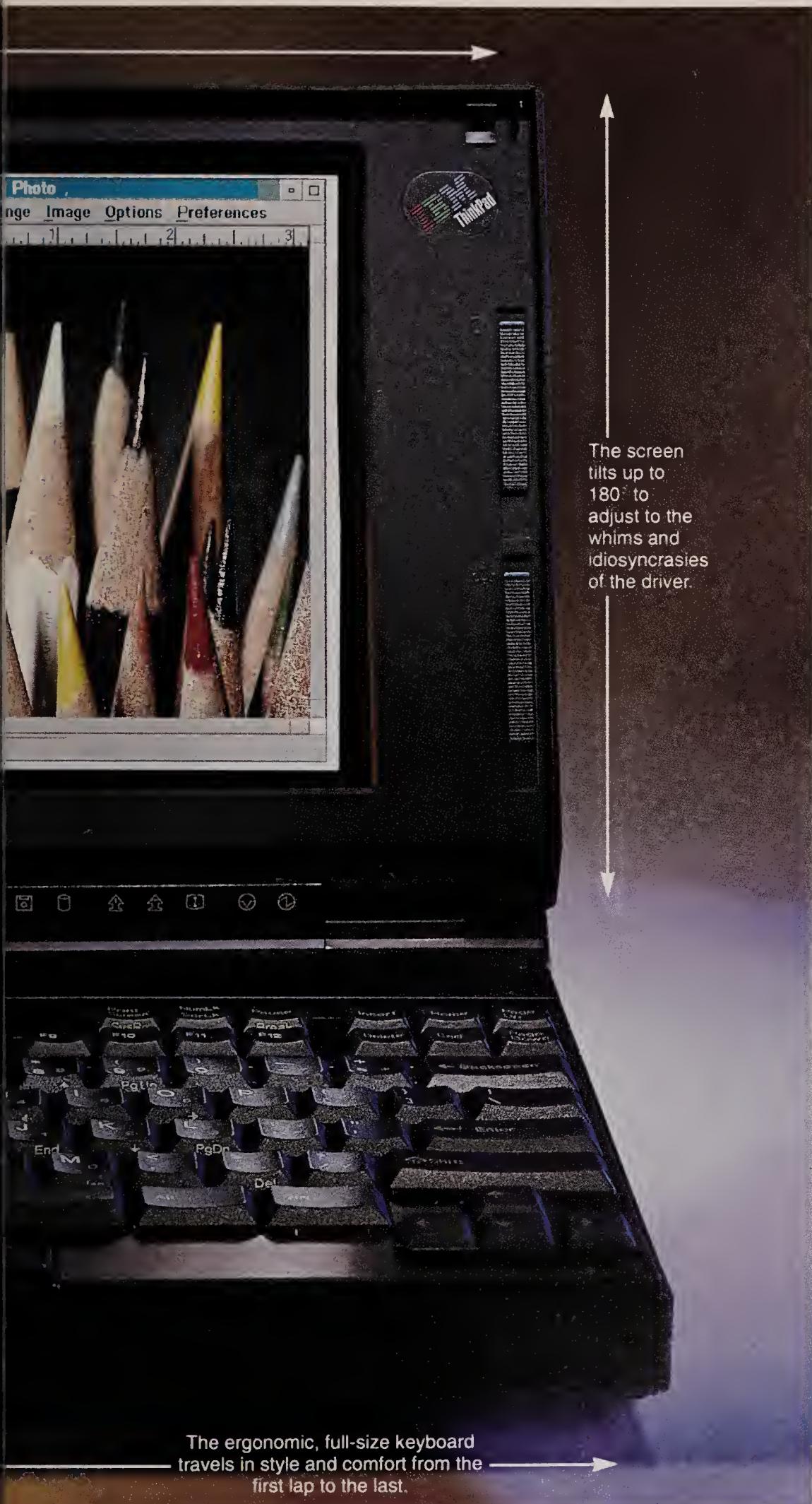
The ThinkPad's screen is a thing of almost aching beauty. Its 640 × 480 VGA resolution is sharper than that of many desktop computers. It displays 256 colors. And it's the biggest screen on any notebook. All of which makes ThinkPad very easy on the eyes.

The ThinkPad comes standard with things some other notebooks don't even offer as options. Like 4MB of memory you can upgrade to 16MB. 120MB of hard disk space. Pre-installed DOS 5.0 and

\*Depending on usage and configuration. \*\*MSRP Dealer prices may vary. †Warranty information available from the Personal Systems HelpCenter or an IBM authorized dealer. 700T warranty is available in USA and Canada only. ‡In Canada, call 1 800 465-7999. IBM is a registered trademark and ThinkPad, HelpWare, HelpCenter, SLC and TrackPoint II are trademarks of International Business Machines Corporation. PRODIGY is a registered trademark of Prodigy Services Company. © 1992 IBM Corp.



Its mother was  
Its father was



The ergonomic, full-size keyboard travels in style and comfort from the  first lap to the last.

PRODIGY.\* You can soup it up with a turbo-charged 486SLC2 50/25 MHz processor—just one of the upgrade products IBM offers. And the hard disk is removable, which makes it easy to upgrade and share your ThinkPad, not to mention the great security and virtually unlimited storage.

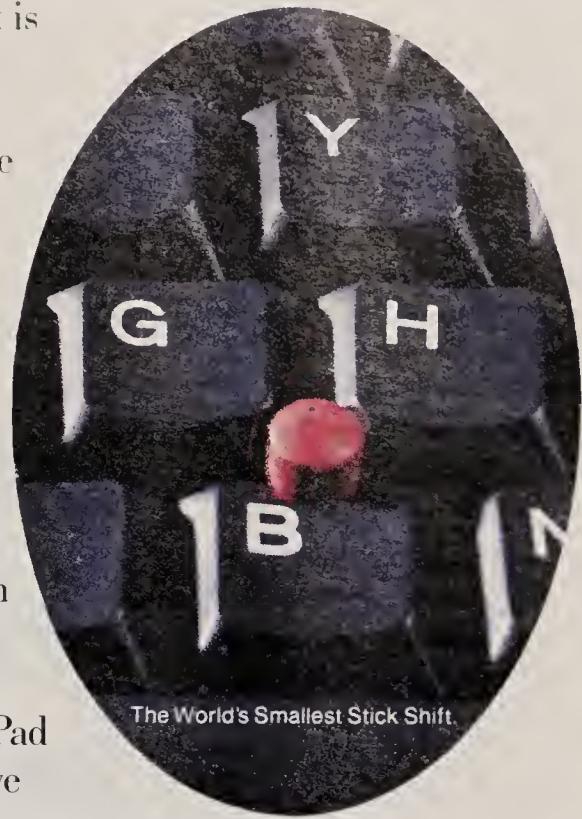
ThinkPad blows the doors off its competition in an even more surprising arena. Price. Any ThinkPad in the line will give you more for your money—and for your psyche—than any other notebook you can buy.

ThinkPad	Model 700C	Model 700
Processor	486 SLC/25 MHz	486 SLC/25 MHz
Display	10.4" Active Matrix 256-Color Screen	9.5" Monochrome Display 64 Grayscale Screen
Battery Life*	2-4 Hours	3.8-7.5 Hours
Weight	7.6 Lbs. with Battery	6.5 Lbs. with Battery
Warranty	3 Years (International)	3 Years (International)
Price**	\$4,350	\$2,750

If you have questions along the way, your ThinkPad Models 700C and 700 are supported by HelpWare™, an invaluable service package that includes a three-year international warranty.†

For more information or an IBM authorized dealer near you, call our Personal Systems HelpCenter™ 24 hours a day, 7 days a week at **1 800 772-2227**.††

Then just park one in your lap and see what happens.



# a mainframe. a Maserati.

## New Products

### System software

KineticSystems Corp. has introduced the HTMS 6000, a VME-based, fully integrated High Performance Test Management System.

The software provides separate windows for text and graphics and can now

run under X Window System. Data collection and conversion, signal conditioning, analysis software, test control, graphical displays and report outputs are offered in an integrated package, according to the company.

Standard features include anti-aliasing filters, programmable gain, auto-calibration and the ability to expand to 1,568 channels.

Time is saved in test setup, report generation and data analysis with menu-driv-

en software, the company said.

Tests plans can automatically be generated, modified, stored and executed. On-board dynamic random-access memory, floating point co-processor and memory management are included.

Pricing for the HTMS 6000 system starts at \$33,000.

► *KineticSystems  
11 Maryknoll Drive  
Loekport, Ill. 60441  
(815) 838-0005*

### Database management

Integral has announced a new combined materials management/accounts payable product.

According to Integral, the product is a fully integrated inventory control system that combines the functionality of the company's materials management application and accounts payable software.

Through a common set of data files shared between the systems, users can receive and review vendor information, purchase orders and receipts.

Separate batch processing procedures are not needed because the application's real-time processing automatically updates records at the same time with data entry, the company reported. The product runs in the CICS environment.

Pricing begins at \$278,000.  
► *Integral  
2185 N. California Blvd.  
Walnut Creek, Calif. 94596  
(510) 939-3900*

### Utilities

Reltech Products, Inc. has announced the availability of a Microsoft Corp. Windows-based utility for DB Excel.

DB Excel is a DB2 Systems Application Architecture repository-based data dictionary for IBM mainframes. Organizations receive complete control over their "meta data" such as the field names and other attributes that define their information systems with DB Excel.

According to the company, the Windows utility enables users to browse through the same important data that conventionally was accessible only to data processing and information systems personnel, assisting users in a variety of departments to make more informed business decisions.

The utility costs \$10,000.  
► *Reltech Products  
Suite 450  
Flint Hill Office Park Four  
3211 Jermantown Road  
Fairfax, Va. 22030  
(703) 691-2023*

### Services

Data 21 has announced Version 4.4 of CICS Help, a software package that facilitates IBM Common User Interface Contextual Help for CICS applications and Hypertext On-line Documentation.

New enhancements and options include improved Hypertext support such as Hypertext jumps and pop-up definitions enabling users to create PC-style Hypertext documents in CICS.

Dynamic Database Access allows files to be defined to CICS Help, which presents fields in the Help and Field prompts displayed in CICS Help. PC "authoring" support is available for options designed for WordPerfect Corp.'s WordPerfect 5.1 and Word for Windows 2.0.

CICS Help pricing starts at \$6,005 for DOS and \$14,995 for MVS.

► *Data 21  
Suite 121  
3838 Carson St.  
Torrance, Calif. 90503  
(310) 543-5599*

# THREE DAYS TWO ORGANIZATIONS ONE MISSION



**Announcing  
ICA COMNET DALLAS '93  
May 18, 19 and 20  
Dallas Convention Center**

Over 120 exhibitors already agree that ICA COMNET DALLAS '93 is more than just a show—it's an event that no one in the communications industry can ignore. The mission of the International Communications Association (ICA), the largest international corporate end-users group, and World Expo Corporation, the producers of COMNET, is to combine their proven strengths to create one of the biggest, most dynamic events of 1993.

ICA COMNET DALLAS '93 is a must!

#### Find Out More About ICA COMNET DALLAS '93

Send me more information regarding opportunities in:  
 Exhibiting  Attending  Speaking

NAME \_\_\_\_\_  
TITLE \_\_\_\_\_  
COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_  
PHONE (\_\_\_\_\_) CWA \_\_\_\_\_ EXT. \_\_\_\_\_ FAX (\_\_\_\_\_) \_\_\_\_\_

MAIL TO: ICA COMNET Expositions, Inc.  
111 Speen Street, P. O. Box 9107  
Framingham, MA 01701-9107

FAX TO: 508.872.8237

CALL: 800.545.EXPO

**ICA COMNET**  
DALLAS '93

The Conference and Exposition for the Enterprise Network

ICA COMNET DALLAS '93 is jointly produced, organized, and managed by the International Communications Association and World Expo Corporation

# Only One Software Covers Every Desktop Strategy

## The SAS® System The World's Leading Information Delivery System

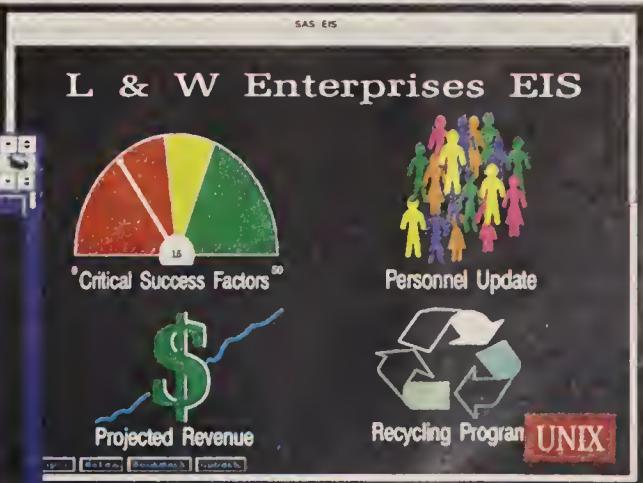
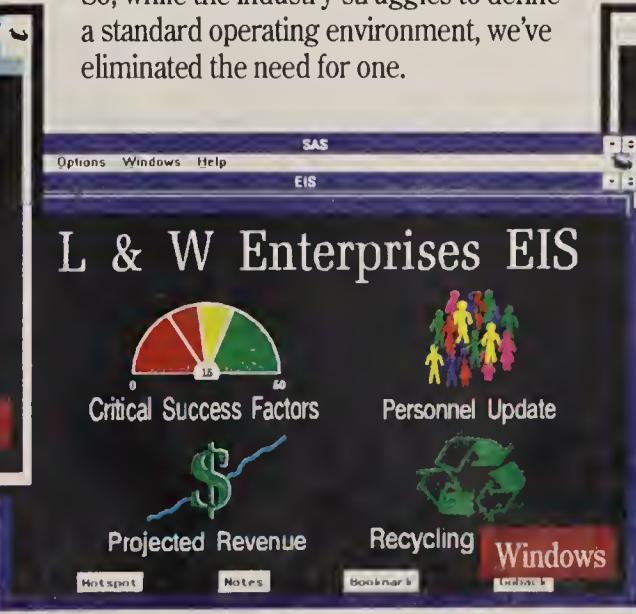
### Windows™? OS/2®? UNIX®?

The debate rages on over which desktop operating system is best. Fortunately, the question of which software to choose has been settled once and for all. All you need is the SAS System.

What's more, the SAS System is portable across all your hardware. Our exclusive MultiVendor Architecture™ lets you integrate different desktop platforms (who *says* you have to choose?) and share data and applications

between the desktop and larger machines. So, while the industry struggles to define a standard operating environment, we've eliminated the need for one.

And cut out the expense of buying—and supporting—all those stand-alone desktop solutions. See for yourself in a free video. Just give us a call at 919-677-8200.



The world's leading information delivery system provides a single, cohesive, and cost-effective solution for virtually any applications request. From executive-level information systems to total quality management systems for the manufacturing floor. Customized interfaces make it easy for anyone—at any level—to gain immediate productivity.

### Call Now for a Free Video Introduction

With the SAS System, you can rely on a single software system for Windows *and/or* OS/2 *and/or* UNIX *and/or* any other platform.



SAS Institute Inc.  
Sales & Marketing Division  
SAS Campus Drive □ Cary, NC 27513  
Phone 919-677-8200 □ Fax 919-677-8123

SAS is a registered trademark and MultiVendor Architecture a trademark of SAS Institute Inc., Cary, NC, USA. Other brands and product names are registered trademarks or trademarks of their respective holders. Copyright © 1992 by SAS Institute Inc. Printed in the USA.

APPLICATION DEVELOPMENT TOOLS COMPANIES ARE ONLY POWER AND EASE OF USE ARE ISSUES  
POWER AND EASE OF USE ARE ISSUES  
100 HAPPY TO DISCUSS



The sweeping claims made by some companies about their application development tools can conceal some glaring drawbacks. Like weak, ineffective languages that don't stand up to complex applications. And awkward user interfaces. That's why the industrial strength of PowerHouse™ 4GL with the easy-to-use, client/server technology of PowerHouse Windows™. So sweep away whatever notions you may have about traditional application development.



OPEN TOOLS FOR A  
CHANGING WORLD.

1-800-4-COGNOS or 617-229-6600 ext. 81 (in Canada, 1-800-361-3163).

© 1992 Cognos, Incorporated. Cognos and PowerHouse are registered trademarks and PowerHouse Windows is a trademark of Cognos, Incorporated. Cognos supports all major commercial UNIX and midrange proprietary platforms.

## Data modeling: Tough but rewarding

By Johanna Ambrosio

Data modeling is rather like going to the doctor for wellness checkups: You know it is good for you, but you cannot necessarily quantify the benefits.

Although hard numbers are tough to come by, those who have done data modeling say it offers many advantages. Among them are getting data to users in a format that supports their business requirements and cleaning up conflicting and redundant data formats that are part of most large companies' information systems repertoires.

But data modeling is not easy or cheap. It can be a five- to 10-year effort fraught with political battles and difficulties justifying it to top management.

Data modeling, in its essence, is defining what the business does and how, and then figuring out what data is required to support those requirements. This information is then modeled and drives all application development efforts.

Donnette Bruno, a data administrator at Barnett Technologies, Inc. in Jacksonville, Fla., likened data modeling to "cleaning MIS' house." In her last job, at an insurance company, "We found 87 different varieties of region code. Why? Because programmers were doing what they were trained to do: being creative. And they were very good at it," she said.

Alan Kortesoja, a partner at Ernst & Young in Ann Arbor, Mich., said changing business requirements have forced insurance companies into the vanguard of data modeling. "Insurance companies are thinking now in terms of providing services, not in terms of individual policies. But

**It is often difficult to convince management that a data modeling effort is needed.**

the old batch systems just weren't set up that way."

Most companies, he added, are doing data modeling in fits and starts. That has been the case at Blue Cross/Blue Shield of Minnesota, which began data modeling about 2 1/2 years ago but has been doing it "intensely" for the past year, said Steve Hiller, manager of data resource management.

"The primary benefit has been clarifying terminology to the business people, so we all have one way of communicating with each other."

Mellon Bank Corp. has been involved with data modeling for about three years, according to Jim Stuber, first vice president. "It's been very successful. The quality of applications has improved," he said. The bank measures that quality by how stable applications are once they are in production.

"If you're building relational applications," Stuber said, "you need to be doing data modeling. If you don't, you'll build relational systems the same way you built the old ones."

Bruno said she has heard of returns on investment ranging from 20% to 80% from data modeling. Those numbers are difficult to substantiate, however, in part because of the challenges to data modeling. These include justification and political battles.

Kortesoja said, "The general problem with an architectural group is that it's hard to relate to cost reduction or revenue enhancement," the two primary motivators for any business decision. As a result, it is often difficult to convince management that a data modeling effort is needed.

Still, he said, some firms justify it "on the basis that they are going to lose revenue or miss op-

portunities" if they do not get their data act together.

Another problem is the political situation. "Systems people are our worst enemies," Bruno said. "They think we're taking their jobs away."

Kortesoja noted that part of the problem is that some data modelers become almost religious in their zeal for perfect data. "Other people look at them as a strange cult that is hooked on data. There can be a certain righteousness about people who are 'into' data," he added.

One way to avoid that, Kortesoja said, is to "help the developers understand that you're doing something for them, too — providing a better understanding of how their application works." For that reason, he said, some companies assign a data modeler to every applications development team.

### Start where?

A big question at many companies is how to get started. It can be a catch-22 of modeling data for existing applications, which are presumably working and would be a hard sell, vs. a top-down effort that starts with the business needs.

Del Monte Foods in San Francisco struck an approach that may not sit well with data modeling purists. The company is implementing a corporate repository for decision-support applications.

"I've already warned the users that they will have conflicting data formats," said Les Bain, manager of data resources. "When they start screaming, I'll begin data modeling to clean everything up."

Still, it can be worth the time and effort. "We started in 1985," said John Chatfield, senior principal analyst at Salt River Project in Phoenix. "It's led to rapid systems development and data standardization that has paid big benefits, and now it's pretty much routine."

### What is data modeling?

The process of matching business requirements to the data needed to support them. The resulting models are used to drive future applications development.

### Status

Insurance firms, banks and telecommunications concerns are the primary users of data modeling techniques. In most other companies, the effort is fraught with political and justification battles.

### Benefits

Faster systems development and standardization of data for use by varied applications.

### One user's comment

"If you're building relational applications, you need to be doing data modeling. If you don't, you'll build relational systems the same way you built the old ones."

## ON SITE

### Levi Strauss & Co.

San Francisco

**Challenge:** Discover alternatives to the traditional mainframe development platform and identify the best method for each application.

**Technology:** Sun servers, Sybase database management system and ParcPlace Systems Objectworks/SmallTalk language.

## Levi Strauss cuts client/server pattern

By Jean S. Bozman  
SAN FRANCISCO

After years of running its business on IBM mainframes and Hewlett-Packard Co. computers, Levi Strauss & Co. is taking client/server systems for a test drive. The \$5.4 billion company is in the final stages of completing a pilot project to prove that object-oriented programming, workstations and Unix servers can be used in production systems.

The pilot project, named Orion, began in June 1991 with a few basic building blocks: Unix, Sun Microsystems, Inc. servers and the Sybase, Inc. relational database. Those basic elements were selected

beforehand by a special task force within Levi Strauss called Information Technology Action Group.

During the Orion project, a team of eight programmers and analysts learned new ways to create applications and had to master object-oriented programming techniques. The clothing firm now plans to test a pilot Unix application in several business units before approving the rollout of production client/server systems.

"We see the effort as

providing an alternate platform to our mainframe development environment," said project leader Craig Lee, who is manager of Levi Strauss' Advanced Technologies Group. "We will develop the criteria to choose which development method is appropriate for each application. The long-term goal is to use our mainframes as database servers."

Doing that would allow user PCs and workstations to access data on either the IBM mainframe systems or their HP counterparts in Levi Strauss' international organization. Mainframes will serve as data repositories under Levi Strauss' re-engineering program, known as the Customer Service Supply Chain.

Levi Strauss, page 145

Levi's Orion/Genesis platform					
		SERVER		CLIENT	
		Open Windows Deskset		Facets	
		Open Windows		Smalltalk/ Objectworks	Lotus 1-2-3
		Sy-base	SunLink SNA3270	SunNet Manager	Word-Perfect
		DB2 interface		NIS, INF5	SunPC
				Answer-Book SunSolve	Open Windows Deskset
				Native SunOS	
				Backup Copilot	
Unix (SunOS 4.1.1)					
Sun 4/470					
SunNet Manager Agent					
Unix (SunOS 4.1.1)					
Sun IPC					

# Basic gains commercial respect

By Garry Ray

Basic, the 1960s brainchild of two college professors, is making headway as a "serious" programming language in corporations. But developers faced resistance as they began suggesting use of the language.

Though Basic was once considered in-

adequate for corporate needs such as structured programming, database access and maintainability, the turn toward the language is being fueled by Microsoft Corp.'s Visual Basic for Windows, which was recently upgraded. With more than 113,000 Visual Basic applications now in business use, according to Microsoft, the

language is clearly taking hold. "The source of Basic's [tawdry] reputation is on decades of old interpreted technology, not on compiled, event-driven Basic," said Tom Button, a group product manager at the Redmond, Wash., software company.

While that may be the case, converts to Visual Basic said there was initial resis-

tance to using it as a prototyping and development language.

"I cringed when I first heard about Visual Basic," said Heng Tan, a manager of application development at The Prudential, an insurance firm located in Newark, N.J. Tan, an experienced C and Cobol programmer, had been looking for alternatives to C and Microsoft's Windows Software Development Toolkit, which he thought were not appropriate for his team of five former Cobol programmers. After looking at "other development tools, all of them," Tan said Microsoft's Basic seemed to satisfy a number of development concerns.

Among those were that the language could be used to prototype applications quickly; that code could be reused in multiple projects; and that no runtime license fees were required for finished applications. "There's no runtime to distribute, so from a corporate point of view it's a no-brainer," he said.

Other managers stressed the importance of maintenance and an ample supply of Basic programmers. "Management doesn't have concerns about what happens if I get hit by a truck. It's easy to find people who can program in Basic," said Tim Landgrave, an MIS manager at a Midwestern oil company and owner of consulting firm Kizan Technologies, Inc. in Louisville, Ky.

### C advocates

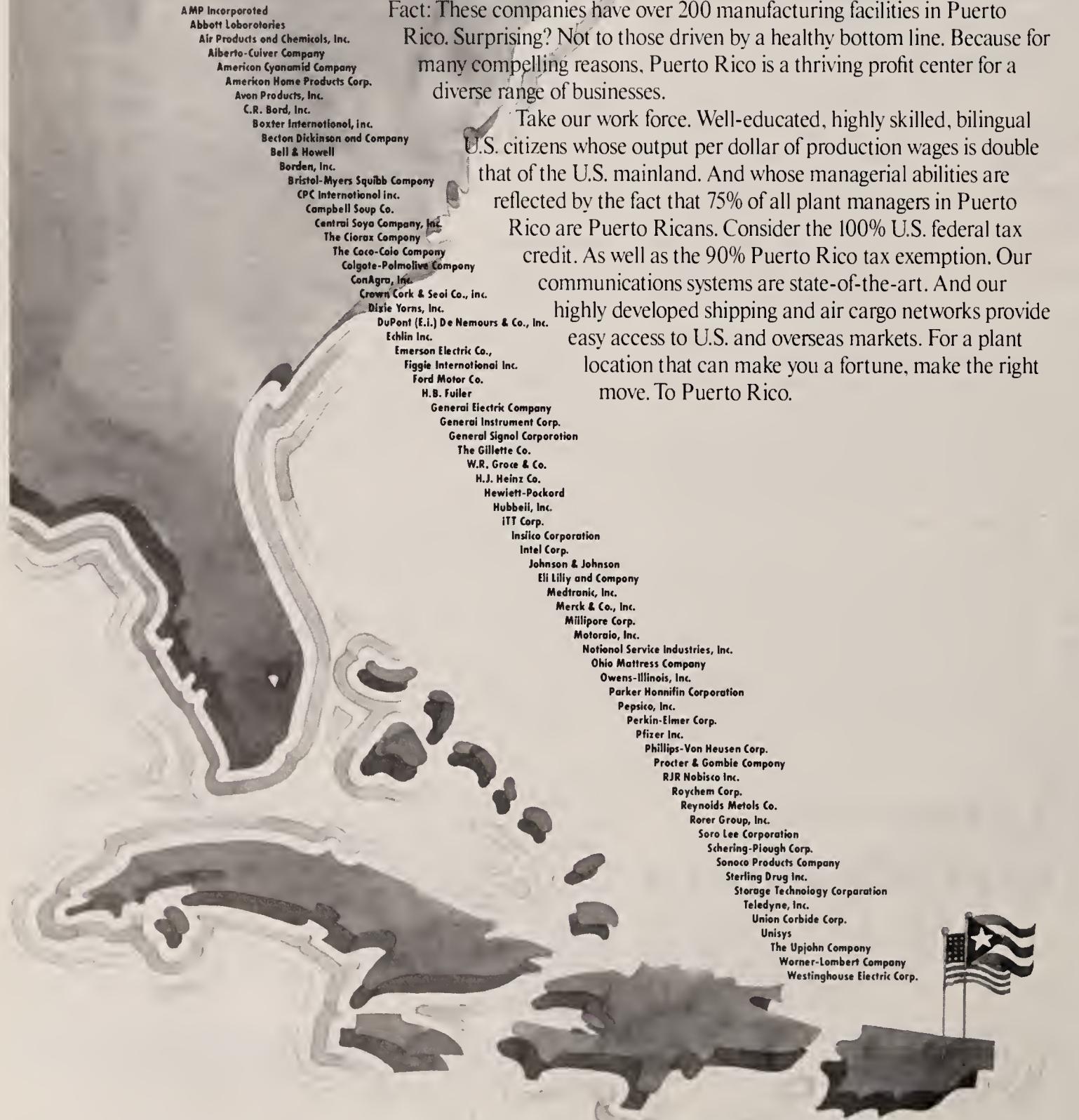
Despite its benefits, advocates of Basic development still encounter what Frank Peters called "C snobbery." Peters, president of Plaid Brothers Software, an Irvine, Calif., development house, described one development contract where "we asked if we could go from C to Visual Basic, and in five minutes we were fired." He maintained that Basic is a more suitable vehicle for rapid application turnaround because "you can't keep your head above water with C and C++ no matter how many programmers you have."

The ubiquitous nature of the Basic language also made it easy for Nielsen Marketing Research, the Northbrook, Ill., division of A. C. Nielsen, to deliver front-end technology for its Nielsen Infact Workstation. The workstation includes market research databases of up to 1.5G bytes and a range of front-end database access tools that are delivered to customers as Visual Basic VBX controls. VBX programs and controls are customized additions to the Visual Basic tool set.

"We buried some VBX controls in the front end so that if someone wanted a button that would give database access, all they have to do is add it to the application," said Walt Wickman, director of global delivery technology at the firm.

Even a few C programmers, noted for their aversion to other languages, are beginning to consider the benefits of Basic programming. Sunil H. Shali, a Farmington Hills, Mich., software consultant specializing in process control and data acquisition, said, "I've shown [Visual Basic] to some C programmers, and they are very surprised. Some are now using it instead of C or C++." As for the unconverted who "think Basic is a toy," Shali said, "They don't know there isn't much of a difference in languages."

# YOU DON'T MAKE THE FORTUNE 500 BY MAKING BAD MOVES.



AMP Incorporated  
Abbott Laboratories  
Air Products and Chemicals, Inc.  
Alberto-Culver Company  
American Cyanamid Company  
American Home Products Corp.  
Avon Products, Inc.  
C.R. Bard, Inc.  
Becton Dickinson, Inc.  
Becton Dickinson and Company  
Bell & Howell  
Borden, Inc.  
Bristol-Myers Squibb Company  
CPC International Inc.  
Campbell Soup Co.  
Central Soya Company, Inc.  
The Clorox Company  
The Coco-Cola Company  
Colgate-Palmolive Company  
ConAgra, Inc.  
Crown Cork & Seal Co., Inc.  
Dixie Yarns, Inc.  
DuPont (E.I.) De Nemours & Co., Inc.  
Echlin Inc.  
Emerson Electric Co.  
Figgie International Inc.  
Ford Motor Co.  
H.B. Fuller  
General Electric Company  
General Instrument Corp.  
General Signal Corporation  
The Gillette Co.  
W.R. Grace & Co.  
H.J. Heinz Co.  
Hewlett-Packard  
Hubbell, Inc.  
ITT Corp.  
Inisico Corporation  
Intel Corp.  
Johnson & Johnson  
Eli Lilly and Company  
Medtronic, Inc.  
Merck & Co., Inc.  
Millipore Corp.  
Motorola, Inc.  
National Service Industries, Inc.  
Ohio Mattress Company  
Owens-Illinois, Inc.  
Parker Hannifin Corporation  
PepsiCo, Inc.  
Perkin-Elmer Corp.  
Pfizer Inc.  
Phillips-Van Heusen Corp.  
Procter & Gamble Company  
RJR Nabisco Inc.  
Roychem Corp.  
Reynolds Metals Co.  
Rorer Group, Inc.  
Soro Lee Corporation  
Schering-Plough Corp.  
Sonoco Products Company  
Sterling Drug Inc.  
Storage Technology Corporation  
Teledyne, Inc.  
Union Carbide Corp.  
Unisys  
The Upjohn Company  
Worner-Lambert Company  
Westinghouse Electric Corp.

## PUERTO RICO

Profits are our biggest export.

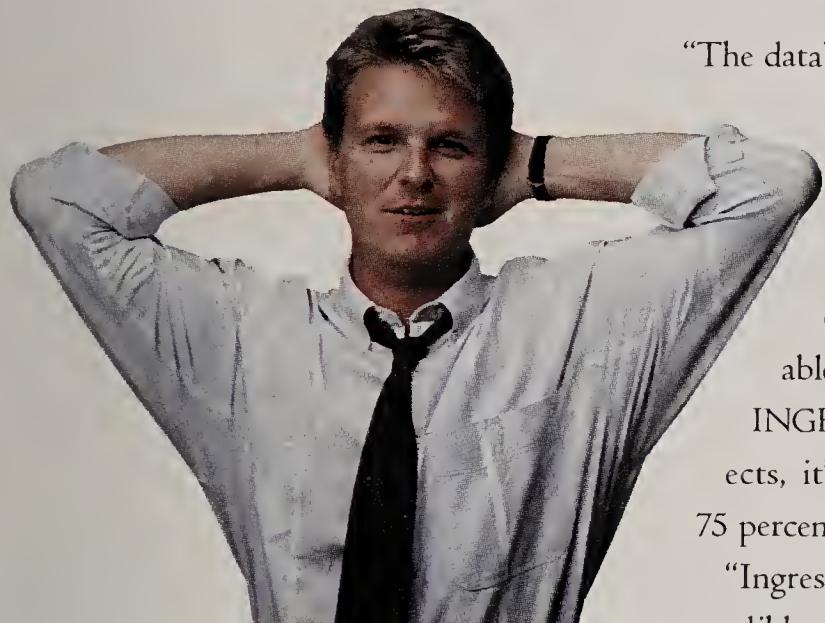
Please send me specific information on the advantages of Puerto Rico.  
Mail to: Commonwealth of Puerto Rico Economic Development Administration  
666 Fifth Avenue  
New York, NY 10103-0138  
Or call (212) 245-1200 Ext. 461 or (800) 377-6789  
Or fax (212) 581-2667

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Telephone ( ) \_\_\_\_\_ Product \_\_\_\_\_  
Current expansion project \_\_\_\_\_ Future expansion project \_\_\_\_\_  
CW111692

# Why Ingres can cut your applications development time by 60%.

Imagine an application that took two years just to prototype. Now imagine creating the fully functional version in only three months. That's what one of our customers did using Ingres' extraordinary development tools.

First, there's INGRES/Vision™. It gives you a visual interface and 4GL code-generating technology that actually writes code for you. Next, there's INGRES/Windows4GL™, which lets you create graphical client-server applications by simply pointing and clicking. That cuts development time by an average of 60%.



Anders Nicolausson, National Systems Manager, Construction Market Data, Inc., 250 employees in 15 U.S. offices.

"The database we collect, massage, and manipulate to generate reports for clients *is* our business. The demand for new applications obviously is intense. I've been able to meet that demand with INGRES/Vision. On many projects, it's cut development time by 75 percent.

"Ingres' technical support is also incredibly responsive. No matter when I call, their support engineers always call back right away."



With INGRES/Windows4GL, GUI applications written in one environment can be deployed across all major windowing environments, without recoding.

Since its beginnings at U.C. Berkeley, Ingres has built a strong record of technological leadership. As Marilyn Bohl, Senior V.P. for Worldwide Engineering, explains, "Ingres has a long history of firsts. Furthermore, we have gone far beyond simply pioneering new database and tools technologies. We translate our technology into practical, useful products like INGRES/Vision and INGRES/Windows4GL.

"By focusing on the underlying architecture of the database and how to achieve optimal connectivity to it, Ingres is able to maximize the power and performance of

## Technological Innovation

1983	First client-server RDBMS
1985	First RDBMS-4GL integration
1986	First database gateway
1987	First transparent distributed RDBMS
1988	First UNIX DBMS to break 100 TPS
1989	First intelligent database, object support
1990	First RDBMS with automatic two-phase commit
1990	First RDBMS-graphical, OO 4GL integration
1991	First production-quality 4GL generator
1991	First SQL-based event alerters

open systems, and to provide the best possible framework for your move toward client-server computing. The result is a system architecture that mirrors the way your business works, and solves business problems."

If you'd like to know more about the effect Ingres can have on your productivity, call **1-800-4-INGRES**. Within Latin America, call **1-305-789-6685**.

GA-II75

 **Ingres**



# Canadian Airlines International Found A Strong CASE For Managing Change.

In the rapidly changing world of the airline industry, Canadian Airlines International Ltd. understands that keeping seats filled and continually exceeding customer expectations largely depend on how well they manage change. So when they wanted to implement a state-of-the-art frequent flier program in record time, they turned to IEF™ CASE software from Texas Instruments.

The Information Engineering Facility (IEF) offers a diverse portfolio of software, which lets you do everything from rebuild high-maintenance-cost legacy systems to develop new strategic systems.

And do it more efficiently with higher quality.

Widely recognized as the leading tool for achieving integrated CASE solutions, the IEF helped Canadian Airlines International create their *Canadian Plus*® frequent flier system in less than half the time it would have normally taken to build it from scratch.

Today, Canadian Airlines International knows the IEF can help them adapt to change in other areas as well. They realize the IEF has many strengths other than just enabling reduced application development times.

Richard Nelson, Director of Operations,

Canadian Technology Services,  
Canadian Airlines International Ltd.,

said, "It (the IEF) has brought the airline tremendous benefits in staff and operating cost efficiencies."

In the end, Canadian Airlines International, with the help of the IEF, produced an outstanding frequent flier program. Customers get better service and Canadian Airlines International has increased passenger count.

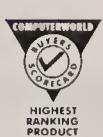
Canadian Airlines International is just one of many companies in a diverse range of industries that have also found a strong CASE for managing change. We'd like to share a few more CASE histories with

you. Call us now for a copy of *The IEF at Work*. Government purchasers please reference GSA#GS00K92AGS5530.

**1-800-336-5236.**



Richard Nelson  
Director of Operations  
Canadian Technology Services  
Canadian Airlines International Ltd.



 **TEXAS  
INSTRUMENTS**

©1992 TI 76573

IEF is a trademark of Texas Instruments Incorporated. *Canadian Plus* is a registered trademark of Canadian Airlines International Ltd.

# BILL GATES WANTS TO SHAKE YOUR HAND.

**But first you'll have to win the 2nd Annual WINDOWS WORLD Open,  
Computerworld's Custom Application Contest  
at WINDOWS WORLD '93 in Atlanta, May 24-27.**

So you think your custom Windows™ applications look pretty good?

Then show the world at the 2nd Annual WINDOWS™ WORLD Open.

If your custom application wins, you'll join Bill Gates at an awards ceremony and private reception in your honor.

In fact, if your entry is one of those selected, we'll pay for all necessary equipment to be shipped to WINDOWS WORLD to demo your winning application, and you'll receive free admission to the conference and the exhibit.

And finally, you and your company will be featured in Computerworld. How's that for instant fame and fortune?

**Here's what our WINDOWS WORLD Open Winners will look like.**

We're looking for innovative applications made possible by you and Windows.

For instance, maybe you created an

executive information system, or a field sales office reporting system, perhaps you downsized a host application, or wrote a mainframe-to-micro user access system.

Enter it!

#### **Do you have the Qualifications?**

Your entry should be a custom program currently in use (not a prototype), and not for resale.

It should also be either an entirely new application, a modification of an off-the-shelf application, or a Windows front-end for a host application. And of course, it should require Windows.

Entries will be accepted in the following eight industry categories: 1) Manufacturing, 2) Finance, 3) Insurance/Real Estate, 4) Transportation/Communications/ Utilities, 5) Services/ Professions, 6) Wholesale/ Retail/Distribution, 7) Government/Public Administration, and 8) Other.

#### **Call for Entry.**

Just call the WINDOWS WORLD Open Hotline toll-free at 1-800-829-4143, or 1-206-443-3329 to request your official WINDOWS WORLD Open entry kit.\*

The deadline for entry is Midnight, February 15th, 1993.

But hurry. The first 200 entries receive a free WINDOWS WORLD Open T-Shirt.

So call now. Because the competition is right around the corner. And Bill is looking forward to meeting you.

**Sponsored by:**

**COMPUTERWORLD**  
The Newspaper of IS

**Microsoft®**

**WINDOWS™ WORLD**

At Candle,  
we're  
as committed to  
IS people as  
we are to  
IS technology.

**!Candle®**  
*Making Your Systems Perform*

Dear IS Professional,

When an IS organization succeeds in meeting the needs of the enterprise, technology often gets the credit.

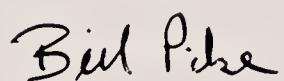
While carefully applied technology can help companies succeed in the marketplace, at Candle we believe that the people who make that technology work are just as important.

It's the people in IS organizations who work to see the needs of the future, define the strategies necessary to meet those needs, evaluate available and emerging technologies, cut through the confusing clutter of competing claims, and build and implement the solutions that help the enterprise move forward.

Believing in IS people is not new for Candle. As a leading vendor of innovative software solutions, we have worked shoulder-to-shoulder with our customers for 15 years. Our customers believe in us to deliver solutions that meet their needs in systems, automation, and database management.

To find out more about how Candle is as committed to IS people as we are to IS technology, just fill out and send in the attached business reply card.

Sincerely,



Bill Pike  
Senior Editor, Candle Publications

# Meet Computerworld's Gary Beach

## IN SIGHT

**Eighteen months ago, Davis Tharayil was confronted with a very difficult IS mission; that of developing and implementing an information technology framework which was flexible and yet true to the overall culture of Aetna Insurance. We recently spoke to Tharayil about the challenges he initially faced and how well the framework is working today.**

*Gary Beach, the publisher of Computerworld, has the uncanny ability to memorize people's names as he is casually being introduced to them just before he is about to speak. During his presentation, he makes direct eye contact with an individual and deftly weaves each person's name into his presentation. "We feel that people, such as you, Jim Smith, have a role to play in helping to change the direction of our industry." Beyond technique, Beach is a dynamic, knowledgeable speaker. He appears to relish the opportunity to speak to people about the publication and*

*information technology. He easily gains and holds the attention of his audience. It is, of course, his business to know a great deal about the current state of the IS industry as well as new computing trends.*

*Beach's fast-path career has seen him rise rapidly, having been in the data processing and publishing industry only little over 12 years. For eight of those years he was with Data Communications magazine at McGraw-Hill. In 1987 he went from being the sales manager of Data Communications to managing a new weekly they started called Networkworld. Four years later, in the Spring of 1991, he moved over to Computerworld and for the last 10 months he has held the position of publisher. The following interview offers insight into the mindset of this dynamic, and outspoken IS manager.*

**Q: Do you enjoy meeting and talking with your readers?**

A: Yes I do. We conduct eight surveys, two a quarter. We also run focus groups around the country. We never miss an opportunity at a trade show to sit down with our readers and find out what's on their minds. They are the ultimate judges of how well we're doing. And if they're saying we're doing a good job, they're going to vote with their pocketbooks and renew their Computerworld subscriptions.



**Q: It seems that very few computer industry publications last long before merging or going out of business. Computerworld is one of those rare exceptions. Why is that?**

A: It's very simple. We're driven by a rudimentary vision; staying close to our readers' needs. We ask them how we are doing and what do they like to see? We also ask them to tell us what they see that they don't like. What are the burning issues that keep them up at night? How can we address those needs and concerns better? By meeting their needs, we have been successful over the last 25 years.

**Q: Do you need to be aggressive to stay on top?**

A: Oh yes. Climbing a mountain is fun but staying on top of it can be very challenging.

**Q: Why is that?**

A: Because we're always in the sights of our competitors. We have to work very hard and be

externally focused. We have to get out there on the road and talk to our readers, to find out what their needs and concerns are.

We need to manage Computerworld like a new, "start-up" enterprise. That is the message I've been communicating to my management team over the last ten months. When you work for a start-up company, it's exciting. During those first critical years, everyone has energy, enthusiasm, and a shared vision. The enterprise has, as a result, a sense of vitality. If we blend the passion new companies enjoy with a well-established product, we have a winning combination.

**Q: You recently presented a series of seminars across the country in which you identified several distinct management cultures that currently exist within the IS environment. Would you define them again, please?**

A: Yes, but let me first tell you why we were interested in

knowing more about our cultural management style. I believe we've all heard a number of industry gurus describe what they think IS and data processing managers are like.

The untested, but widely accepted, image has been that of a group of nervous, worried people working in the glass house watching their power base steadily erode. These people are often described as being defensive and powerless. We are told that they have passively resisted change as new IT opportunities came onto the scene, such as open systems, the PC explosion, LAN innovations, etc.

We began to question the image we were being given because it didn't fit our frequent, first-person interactions with our readers, many of whom are IS managers. So we commissioned a psychographic cluster study to better understand who IS managers really are. As a result of the study, we found five distinctive IS management styles (see Figure 1). Let me briefly describe each type:

- **IS Warrior (Operating Style – Entrepreneurial).** The study shows that what we call the IS Warrior represents the largest segment of our subscribers. These people are leading the charge of computing down the platforms, from the mainframes to the midranges, the workstations, and the PC. The issue that keeps them up at night is, "How do I stay ahead of my end-users' computing needs?" And, "How can I leverage new or existing technology here at XYZ Company do a better job in supporting my end-user departments?"
- **Visionary (Operating Style – IS Champion).** Visionaries are more like corporate CIO types. They're looking at technology,

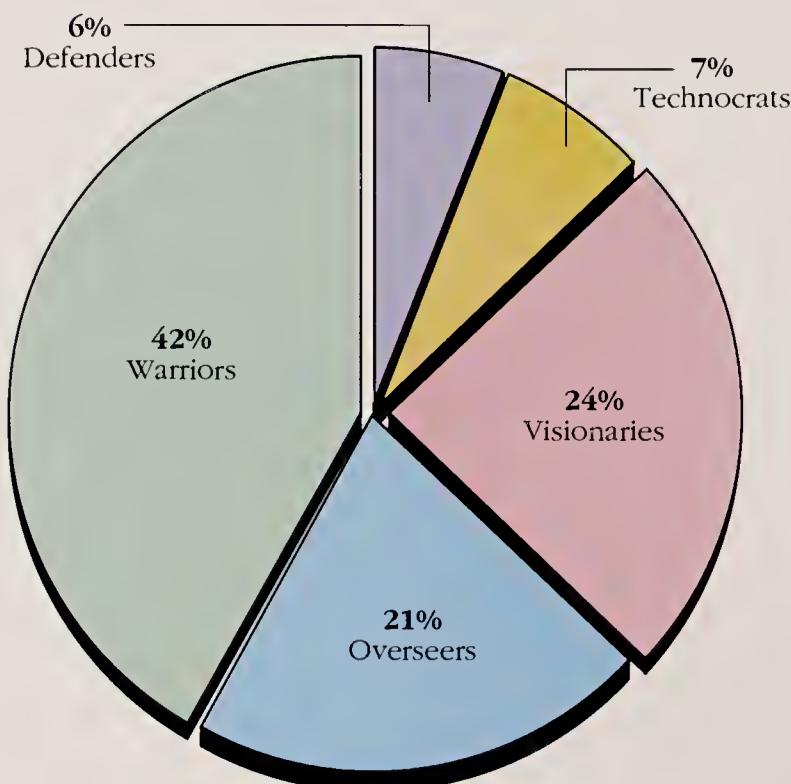


Figure 1 - Computerworld Subscribers in the Five IS Cultures

but rather than from the end-user basis that the warrior uses, visionaries are asking "How can I use this technology to help my corporation be more competitive in the marketplace?" Visionaries take a more macro view of new technology.

- **Overseer (Operating Style – Maintenance Mode).** Overseers are very loyal IS managers, but tend to come in at nine and leave promptly at five. When they are on-the-job, they do a very good job. There's a significant shift in this style from the visionaries and the warriors, who are externally focused, in terms of helping the corporation or end users. Overseers look at technology and IT purchases and ask, "How will this make my life easier?" They have more of an introspective approach when it comes to purchasing new technology.
- **Technocrats (Operating Style – The Old Guard).** The study found these people to comprise a small segment of today's IS management. Technocrats tend to look at technology for technology's sake. They get excited by the fastest chip from Intel, or the biggest IBM mainframe; but they're also the most cost-conscious. They enjoy getting involved in and understanding complexity. Technocrats are highly knowledgeable and will shop for price much more so than the other four groups. They do a lot of comparison shopping and tire kicking.
- **Defenders (Operating Style – Survival Mode).** The last group are the segment of IS management who truly see their power-base eroding and don't know what to do about it.

When they purchase products, their driving motivation is "How is this information technology product going to help me maintain control over what I have left?" Ironically, it is this segment that many industry analysts characterize as the entire IS management community. We found the image couldn't be more inaccurate.

We identified five solid IS management styles in the U.S. in 1992. Of course, each corporate culture is unique and depends on the type of business, age, and management structure of the company. Some organizations tend to encourage a more conservative style of IS management, while others foster more aggressive style. We also believe that there are worldwide counterparts to our U.S. management model.

**Q: Were you personally surprised by the results of your study?**

A: No I wasn't. It confirmed what we saw in the people we met and know. We also conducted a sample across the IDC database, that confirmed our belief that all IS managers (including those who aren't Computerworld subscribers) can be fit into one of the five cultural definitions.

**Q: What happens when the "defender," for example, makes purchasing decisions? Don't his or her decisions influence industry direction?**

A: Not really, because the defenders in IS are a very small management segment. Only six out of every 100 IS managers are defenders. We also believe the number of defenders is decreasing.

**Q: What were the root causes for the emergence of the new, more self-actualized IS management styles?**

A: To answer that question, we have to look back in time. In the 1980s, IS management learned a very important, telling lesson. Prior to 1980, data processing managers "owned" the corporate data by default. It resided on a mainframe within the glass house. The decade of the 1980s marked a time when a new debate began in companies regarding who truly had ownership over corporate information. Underlying the debate was a transition in philosophy. Computers were changing in image from being a "tool" to becoming a "strategic resource."

A less service-oriented management style in many data centers made it difficult to access data and began to trouble the community of end users. Users were growing increasingly frustrated by a poor MIS response to their increasingly sophisticated needs. IS managers were also frustrated by the inability of their staffs to quickly migrate to newer, more reliable systems. The typical MIS project list in the early 1980s was five or six pages or longer. The inside joke was, "You want it when?" with a cartoon character doubled up in laughter.

The advent of the PC quietly signaled the end of centralized data ownership and the productivity logjam of the 1960s-style data center. For the first time, the individual began to own the data. Applications such as PC Spreadsheets, databases, and word processing applications quickly met and exceeded the far less personalized, accessible, user-friendly mainframe solutions.

The increased popularity of the local area network, toward the end of the decade, also marked an important shift in the issue of ownership. Departments in the company, with LANs, began to claim ownership of their local information. IS and data center management of the 1980s initially viewed the exodus of

their most troublesome users and departments with a profound sense of relief. But they soon realized that they were losing an important constituency of their internal user base. They began to see that delivery of information to internal end users is best viewed as a *service-based* relationship and that end users are very much like a business customer. As such, providing information needs to be prompt, reliable, and responsive to the needs of the enterprise.

**Q: Where are we today?**

A: In the 1990s, we see slight back swing of the pendulum. Departments and IS are beginning to share ownership of the data. Technology in the 90s is being applied to help corporations and empower greater productivity.

The computing power that formerly resided only in the glass house is being pushed out into the organization to the midrange and workstation where it is of most value. IS is actively managing the move. We see the 1990s as the "golden era" of corporate computing, and it's only going to get better.

**Q: What about the bad news you print in Computerworld of large reorganizations, layoffs, and downsizing activity in company IS organizations?**

A: Of the sad stories we print, part has to do with a weak national and world economy. Large and small companies are facing difficult, challenging times. The other part has to do with rapid, large scale changes in the IS industry. In any given discipline there are people who cannot adjust to rapid job changes, and they will see their jobs forever altered or go away. It is worth emphasizing that some of the people who have lost their jobs are out of work because they were unable to adapt to the demand for a more responsive IS management style.

**Q: What does the newer IS style require of a manager?**

A: The directive to IS managers is; to do your job properly, you have a mission to assist your "customers" out in the field as well as administering the work within the confines of the data center.

**Q: Do you think the people at the lower end of your management style spectrum can change their behavior and become more visionary or warrior-like?**

A: They have no choice. We're in a very competitive economy, not only nationally but globally, and information is the heart of most organizations. Users, managers, and executives will not stand for an IS organization that behaves like a defender.

**Q: Based on your frequent interaction with your readers, is there a common concern emerging that you hear expressed more often these days?**

A: The major problem, or challenge, facing IS management today, is how do we maintain security as more and more people, new users, come online. It wasn't a particularly difficult issue in the past when data and data management were centralized and the environment was controlled. Today it is a significant problem IS leaders must face as information becomes decentralized and more widely disseminated. Who gains access to critical information and who is denied becomes a non-trivial issue.

**Q: Are there ever times when you wonder about the wisdom and direction of new technology?**

A: I ponder on two issues. One question that I keep asking anyone who will listen is, why does everybody need all those MIPS on their desktops? There are so many MIPS these days,

we're getting over-MIPed. I believe that applications are going to start driving computer purchases and software purchases, much more so than how many MIPS we can cram into a box.

The second issue that I wonder about is that the rate of change and often-misleading claims of new technology can be very confusing to users. IS managers are often very confused by technology claims, as well. Even your most sophisticated CIO is struggling to get a handle on a direction that is in the best interest of a company, for the long-term. The confusion is exacerbated by all the information that reaches the IS manager's desk.

I frequently use a quote from Bill Gates in my presentations, that is very telling. One of the biggest jobs Gates has, is reading all the printed material so he can stay current and can set corporate direction.

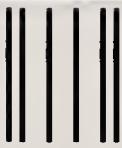
**Q: But doesn't Computerworld also contribute to that mind-boggling load of new technical information?**

A: Without a doubt, we do. Particularly as a weekly newspaper. It's one of the issues that motivated us to redesign our publication. A frequent concern that we hear from our readers is, "I receive my copy of Computerworld on Monday or Tuesday and I can't always get my reading done by the following Monday. I know there's a lot of important information in there. Please help me get to what I need to know, faster."

**Q: Have your readers' expectations of the publication changed since Computerworld first started?**

A: We find that readers aren't as interested in scoops any more. They prefer more in-depth analysis of the information. For example, if Candle was coming

DEPT #902



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

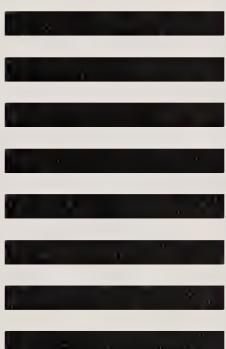
**BUSINESS REPLY MAIL**

FIRST CLASS MAIL PERMIT NO 559 SANTA MONICA CA

POSTAGE WILL BE PAID BY ADDRESSEE

**!Candle®**

ATTN MARKETING SYSTEMS  
CANDLE CORPORATION  
2425 OLYMPIC BOULEVARD  
SANTA MONICA CA 90404-9773



Sign me up for these Candle publications:

- IS People* – Profiles of senior IS management.
- Candle Computer Report* – Mainframe system internals for systems programmers and technical support areas.
- Inside Operations* – Case studies on automation and help desk, operations-specific articles for data center staff, management.
- Interface* – Case studies and technical articles on DB2 for DBAs and anyone involved with database management.

Tell me more about Candle and its solutions:

- Candle – The company and its mission.
- OMEGACENTER™ – Enterprise-wide systems management.
- OMEGAMON® – IBM mainframe performance solutions.
- DB2 solutions for performance, data, and object management.
- Console, systems and performance automation solutions.

Name \_\_\_\_\_

Title \_\_\_\_\_

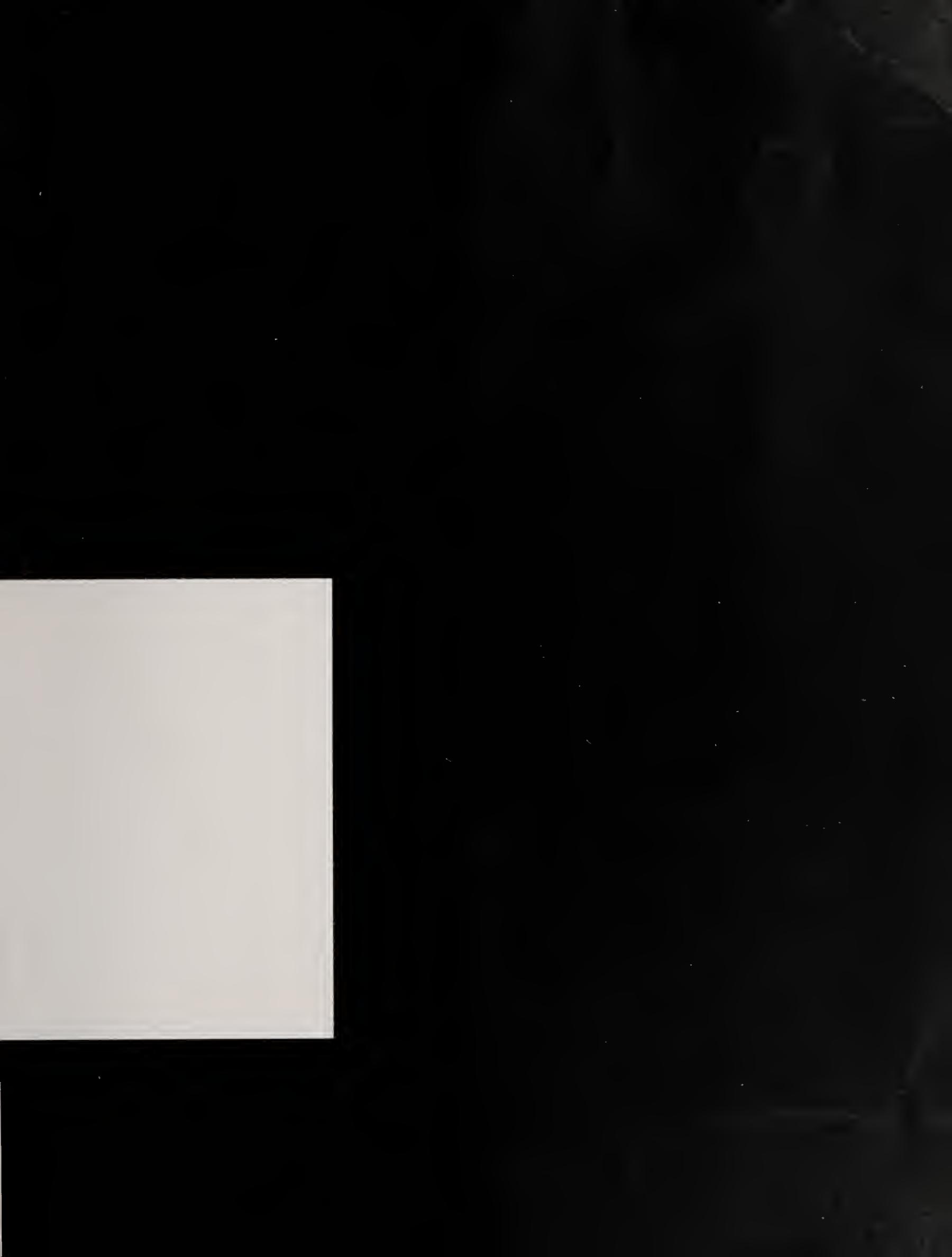
Company \_\_\_\_\_

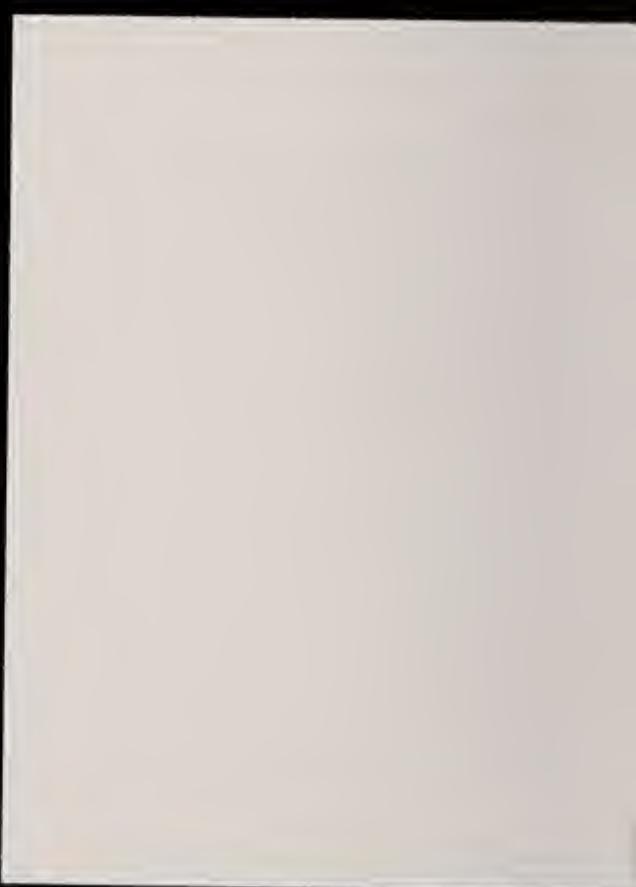
Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone \_\_\_\_\_

**!Candle®**





out with a brand new product next month, it doesn't do our readers much good to see a front-page story in Computerworld unless they understand how the news is of particular value to them. They're asking, why do I need to know about a new product, what is its specific value to me, and are there any problems in the product that I should know about?

**Q: Few computer vendors wish to see the downside of their new offerings in print, yet readers want the most accurate picture they can get, warts and all. Isn't that a challenge for you?**

A: Not really. Our charter is to print accurate, timely information. We are a user advocacy publication. When a vendor markets its answer to every computing problem known to mankind, some of the less invasive publications pick up the language of the press release verbatim. Their stories say, "We too believe this is the greatest product on the market and it looks like the vendor has, once again, saved the industry."

I happen to believe that the IS community is not that naive. So, we run the story, based on what customers, who have actually used the product, are saying. We try to give the stories we run a slant from the user's perspective.

**Q: Can you give another example of writing to the customer's perspective?**

A: We saw on MCI mail that Microsoft bought Fox Software for \$165 million. Our stories the following week were asking what this change means to a Fox Software user. In our stories, there were definite pros and cons.

**Q: How do you respond to the vendor who is embarrassed or angry by an unflattering story?**

A: There are stories that have to be told that are difficult, but

we tell them. If the vendor gets annoyed, we try to convey to that vendor, we're only doing our job. We try to run a balanced story. Consistent with our mission, we're sharing feedback from their constituency base, users, and customers. Our quotes represent how they feel. We print what they told us.

I will sometimes suggest to an upset vendor, contact the quoted customer yourself and if you are told something totally different, come back and let us know. If we misrepresented the information, we'll run a retraction.

**Q: On the subject of marketing/sales claims, how important will the message of technical complexity be to customers in the future?**

A: Let me respond by relating what a very technically bright IS manager with Aetna Insurance Company did recently. He attended our sister publication's (Networkworld) annual conference and brought with him to the conference, the marketing director for the property and casualty division.

They were there looking for a local area network software product to support the specific needs of the property and casualty division. As they passed by companies with potentially suitable products in the vendor area, and were greeted by sales staff, they would insist that, since the director had absolutely no technical background, the salesperson had to present the merits of the product offering in plain English. The IS manager's objective was to ensure that his user could make an informed decision and not be baffled by technical jargon. It must have challenged a few sales people that day!

I think most of us have found ourselves tuning out a technical sales presentation that is trying to impress us with product

complexity and only succeeding in making us feel inept and confused. After all, there are only a few Technocrats.

**Q: A final question. What do you see as the major issues beyond the 1990s? What should IS managers and CIOs be thinking about in preparing for the next 15 years?**

A: Most important, in my opinion, is staying close to your customers. Customers will tell you what to do over the next 10-15 years. While that sounds like an overly simplistic and cliche response, I have found that it holds very true. The most successful IS managers will be those who ask their company's important customers, what are the information issues that really concern you? Over the last ten years, IS management has realized that they have to do that, and from our psychographic cluster study, a majority of them are already doing it today. ■

# Aetna's Information Technology Framework

*Like most large-scale enterprises, the core of Aetna's business is using information. The firm recently adopted a company-wide architecture that provides a means to use information by shaping an information technology environment which is flexible enough to meet business needs and respond to business and technology changes at whatever rate they occur.*

*The challenge of gathering all company opinions, biases, and independent mindsets in order to blend them into a workable consensus would seem to represent an impossible assignment. But then, we spoke to Davis Tharayil, associate vice president responsible over the last 18 months for developing the single-mindset to manage Aetna's complex and diverse IS functions.*

**Q: Davis, would you define for our readers what your management responsibilities are at Aetna.**

A: My responsibility is to define and implement a framework to make consistent decisions related to technologies and information management so as to simplify and leverage our information technology environment.

**Q: That sounds like a difficult assignment. What does the word "framework" mean within Aetna's IS culture?**

A: It has been challenging. The framework is a plan or architecture for the deployment and use of information and information technology resources to support the business.

The idea behind Aetna's architecture definition is that a traditional definition of IT

architecture is inappropriate in a dynamic and unpredictable environment. To most people in IT, architecture is often thought of as a diagram or set of products or lists of approved vendors. The fallacy in this approach is that we are dealing in an ever-changing business and technology environment. A static diagram cannot anticipate nor solve all our new problems. By the time a diagram is approved and published, it is already obsolete. What we needed was a framework that transcended outdated lists which permitted us to make consistent decisions throughout the organization regarding information and information technology resources.

**Q: How did you apply the architecture throughout your organization?**

A: The first thing we did was to understand Aetna's business context and to capture the values with which the senior managers make decisions. We call these values principles. Throughout Aetna, those principles were debated and agreed upon by the business heads as well as the senior managers including our president, Ron Compton.

**Q: Can you give us an example of one of those principles?**

A: Yes, but first let me explain the scope the principles cover. The principles can apply to one or more of four different IS areas: The *information* area, the *infrastructure* area (the term "infrastructure" includes computing, telecommunications, electronic printing and publishing), the *applications* area, and the fourth area, *organization and people*.

Now, to answer your question and give you an example of a principle, "Reuse before you buy and buy before you build."

**Q: That sounds pretty good, but what does it mean?**

A: The principle is saying, if there's a possible solution within Aetna, let's reuse it before we buy it, and if we can buy a solution, let's buy it rather than building it from scratch. We have 13 principles that can apply to one or more of the four major areas. The 'reuse' principle is applicable to most of the areas. It is especially applicable to the information, the infrastructure components, and the applications.

I believe that Aetna is one of the few companies, in the United States, which has created a set of high-level principles, gained senior business and IS managers' acceptance, and actively practices them today.

**Q: Were these principles hard to get focused and finalized?**

A: Yes they were! The principles represent an applied value system company-wide affecting 45,000 employees. Employees needed to understand the rationale for a given principle, why it is a principle, and the implications of the principle. Agreeing on the implications of a principle was the difficult part.

**Q: Somewhat related to the issue of architecture, what has Aetna done to manage its IS costs?**

A: Until recently, Aetna was highly decentralized. IS functions ran in each of the different divisions with some redundancy. One of our first priorities was to consolidate the IS efforts. That was the challenge Aetna was facing when I came on board.

**Q: It seems you faced two challenges; making sure that costs were managed and ensuring that your costs gave**

**corporate IS the highest return on investment.**

A: Yes, both are true. In addition, we wanted to provide greater, more responsive service. We wanted to differentiate in the market through our superior service.

**Q: Let's compare Aetna to another business, commercial banking. In the competitive banking marketplace, needs for IS solutions come up very fast when business opportunities come along. The technical people have to scramble to fit the business needs. How do you compare or contrast that with the industry you're in?**

A: I think that banking is a little bit ahead of the insurance industry in some ways. However, many of the issues that apply to the banking industry are also becoming true in the insurance industry. This is due in part because the insurance industry is also a financial services organization. Both insurance and banking have a number of similar business goals. Both want to manage risks effectively so that they can make money. The raw material both industries are dealing with is information. The challenge to IS organizations in either industry is ensuring that there is an organizational understanding of the importance of information and how it is managed.

In other ways, the insurance industry is more mature than banks. For example if one examines the procedural aspects and management aspects, one finds the insurance industry to be more advanced than banks.

**Q: Insurance companies are often depicted, in advertising, the media, movies, and so forth, as being very slow-moving, predictable, stable organizations. Is that an accurate image?**

A: That image is changing. Most of the money made by insurance companies these days is not from the premiums they charge their customers but from the investments they make on the money from the premiums. Insurance companies are in a competitive time and must make prudent decisions in short time frames.

**Q: Who measures compliance with the principles and who is responsible for carrying them out?**

A: Let me walk you through the process, so that it becomes more clear. The biblical Ten Commandments were a set of architectural principles for a society. They dictated, "If you follow these rules, you'll have a thriving culture." They were a high-level value system. At a high level, ideas can be abstract and it is often difficult to comply with them.

What we have done is translated our high level values into an *architectural vision*. Once one has read the principles and understands all their implications, then what emerges is a glimpse of our future technology environment.

The process consists of four key steps:

- Understanding the business context
- Building the principles
- Drawing the blueprints
- Establishing the standards

Constructing an architecture requires cycling through each of these steps for every component of the IT environment. The business context is important, as it ensures that all of the work is grounded in the business by expressing the themes that will drive Aetna in the coming years.

The IT architecture principles state Aetna's approach to managing information and

information technology. They are closely linked to the business context to ensure that technology decisions closely support business strategies and priorities. We now make our decisions in accordance with the single set of principles to realize a logical, consistent computing environment.

Blueprints are pictures of the desired technology and how it is all interconnected. Standards, the last step, are the specific rules and guidelines for implementing the pictures or models. They permit the physical implementation.

**Q: But technology doesn't stay the same very long in IS.**

A: We recognize that technology is changing, but as long as we know our architectural standard, which is basically specifying the interface and functionalities that we're expecting to make, these different pieces of the architecture to work, then we've separated the technology and product complexities out. If we want to choose a specific product, we simply have to ask, does product X support all our architectural standards related to the different



components? It either fits or it doesn't. Making product decisions using a set of standards becomes easy.

**Q: How is it working?**

A: It's working extremely well, so far. As you know, it takes time for people to start seeing and appreciating the method we are employing to create consistency in our overall plan.

**Q: Is there a downside to it? Do you find detractors within the company who say they're missing out on the latest technology because you have them locked into a plan?**

A: No, I don't think so. In fact, I am actually opening up the possibilities more, rather than restricting them.

**Q: How is that?**

A: Because once we understand the functionalities and interfaces that are needed, we're not locked into a particular product or technology. If a given technology can support me at the interface and functional level, I don't care what technology is underlying it. So that, in fact, I am opening up possibilities to absorb technology.

Most companies that talk about an architecture are really only listing a set of products they will be using. The problem is that each product has its own assumed internal architectures. The company, in most cases, has no idea what the underlying internal architecture is.

We deal with over 600 technology vendors. When we discover

that a product doesn't fit together with other products or systems, we are faced with a very large problem.

**Q: What do you do about non-compatibility?**

A: In the past we built bridges to accommodate the non-connections. We've built bridges over bridges, and the unplanned structures are almost like a house of cards. It doesn't take much of a problem to bring the whole thing down.

**Q: It sounds as if you have changed the way in which Aetna looks at its technology vendors.**

A: Absolutely. We consider our vendors to be strategic partners. A close vendor relationship, built on trust, is one key way in which we will realize cost-efficiency.

Having an architecture and a structure in place has improved our vendor relations with our key vendors that we depend on to do business.

**Q: Do end user departments see the results of your planned approach?**

A: For the first time, our own business users are starting to see the value of this type of a framework, of architecture, and I think our business community is catching on more to the value of being in the driver's seat with technology rather than playing the game of "victim."

**Q: One last question, when you first came to Aetna and got into the job of defining an architecture, did you have a**

**clear vision, or was it a slow discovery process?**

A: Ron Compton, our president, asked, after we presented the approach to him, "How is it possible for you, a 'new guy' coming from the outside into our industry, to gain the consensus from all the autonomous unit heads within nine short months?"

I answered him with an old saying, "When the mind is ready, a teacher appears." But in reality, Aetna Corporation was more than ready to gain control over its IS destiny. An innate organizational readiness needs to be there, otherwise no plan will work.

*Based on assets of \$92 billion, Aetna is the largest stockholder-owned insurance and financial services organization and is the 15th largest U.S. corporation. The firm is involved in healthcare, retirement programs, as well as property and casualty divisions. Aetna's business is world-wide.*

*The information technology area of Aetna employs close to 5,000 technical professionals. The company invests \$.5 billion in technology-related expenses every year. The computing environment consists of 15 mainframes delivering over 1700 mainframe MIPS. The company's population uses over 250 midrange computers and 23,000 personal computers. Close to 3 terabytes of data are managed in DASD. And close to 1.6 billion pages are printed a year. ■*

## Product Information

### Candle Solutions

Candle products and solutions cover four categories that extend systems and applications management to ensure customers receive the greatest possible value from their information technology investment:

**▲ Performance Management** – With OMEGAMON®, the industry standard for total performance management of MVS, VM, CICS, CICS under VSE, DB2, IMS, and VTAM.

**▲ Automation** – The most comprehensive solution available for console, performance, and systems automation.

**▲ DB2 Management** – Managing and automating DB2 performance, data, and object management.

**▲ Application Access** – The ability to develop interfaces that integrate and link existing applications.

Candle's products are integrated into a single solution:

### OMEGACENTER™

Enterprise-wide systems management with status management; performance analysis; automation; and PC-based remote control. Consists of OMEGAVIEW® status management, OMEGAMON performance monitors, AF/OPERATOR®, AF/PERFORMER®, and AF/REMOTE™.

### Performance management

**OMEGAVIEW** – Centralized display of realtime and near-term conditions for MVS, VM, and their subsystems. Collects information and displays status of systems and applications using colored status bars (green – normal, yellow – warning, red – critical).

**OMEGAMON** and **OMEGAMON II®** provide data center professionals with realtime and historical analysis about the efficiency of system performance. Functions include:

▲ Bottleneck, response time, and contention analysis.

▲ Exception reporting based on user-controlled thresholds.

▲ CUA-compliance with green-yellow-red indicators for status of system and subsystem specific elements.

**OMEGAMON II for MVS** – Analyzes workloads, resources, CSA, response time, CPU, DASD, I/O, and storage.

**OMEGAMON for CICS** – Analyzes enqueues, strings, VSAM, etc. Thresholds for hundreds of CICS performance elements. Comprehensive connection information.

**OMEGAMON II for DB2** – Online application trace, object analysis, accounting statistics, audit DSNZPARMs, locking activity, thread activity, DASD I/O, and connections.

**OMEGAMON II for IMS** – Analyzes region occupancy, IMS shutdown in progress, stopped OLDS, online change in progress, connections, and resources. DBCTL support.

### Performance Management (continued)

**OMEGAMON II for VTAM** – Analyzes response time, buffer pools, channel I/O, and virtual routes. Online buffer trace.

**OMEGAMON for VM** – Analyzes working set size, paging, spool utilization, scheduler, vector processor utilization, Free Storage, response time, and minidisk usage.

**OMEGAMON for CICS under VSE** – VSAM string waits, Short-on-Storage, storage violations, etc. VSE analysis for resources, storage, channels, and devices.

### Automation

**AF/OPERATOR** – Systems automation for MVS. Message Manager; Started Task Manager; Programmerless Open VTAM Interface; supports multiple CPUs; interfaces to NetView and OMEGAMONs; and full support of IBM REXX.

**AF/PERFORMER** – Optimizes availability, response time, and throughput. Automatically resolves frequent MVS, CICS, DB2, and IMS performance problems.

**AF/REMOTE** – Outboard access to system and hardware consoles and VTAM applications; secure dial-up access from PC or terminal. Supports IBM REXX; notifies personnel; interfaces with environmental control systems.

### DB2 Management

**IDB™/EXPLAIN for DB2** – Complete SQL, plan, and DBRM optimization and configuration management.

**IDB/WORKBENCH for DB2** – Catalog, query, and object management. Error-free automated utility generation.

**IDB/MIGRATOR for DB2** – Sends DB2 applications from test to production, system to system.

**IDB/SMU for DB2** – Verifies integrity and facilitates online repair of table and index spaces.

**IDB/DASD for DB2** – Reclaims wasted DASD without compression and generates utilities to move datasets.

### Application Access

**CL/SUPERSESSION® for MVS** – VTAM network enhancements for application integration, multi-session management, single-point network access, and complete security. Link applications without touching source-code; track network activities.

**CL/CONFERENCE® for MVS** – Session sharing in real-time. Works with any environment or application, CUA interface and full security. Help desk staff can see what end-users see; online training for multiple sites.

A value-added event for Candle customers



# The Eighth Annual Candle Systems Management User Conference

*Reno Hilton – December 7, 1992  
One day before International Computer Measurement  
Group Conference.*

For free registration and detailed agenda call (800) 843-3970.

## Levi Strauss cuts client/server pattern

CONTINUED FROM PAGE 127

Orion's pilot Shipment Information System application, which tracks clothing materials as they are trucked from denim suppliers to factories to warehouses, will be completed in December. Plans call for the distribution application to be reviewed by four sites, including a transportation center in North Little Rock, Ark., and three business units at the firm's headquarters in San Francisco.

### Retrieving data

Working with Sun IPC workstations, users will be able to retrieve from suppliers electronic data interchange data that has been relayed from an IBM mainframe to a Sun SPARC II server in their business unit.

The system does not use data from IBM's DB2 relational database, which is heavily used at Levi Strauss, in part because the client/server system has no DB2 gateway.

The Shipment Information System application was developed in ParcPlace Systems, Inc.'s Objectworks/SmallTalk object-oriented language, using somewhat of a new type of design and analysis method.

Systems designers categorized object "classes" by using index cards and talking through the object-modeling process with colleagues. The Class Responsibility Collaborators method, which has been described in technical journals and is a ParcPlace developer's technique, fits with Levi Strauss' management policies, which encourage group decision-making.

"In the object world you start by defining classes," explained Lanny Lampl, a technical consultant in Levi Strauss' Information Resources Group. "You have to parcel out the responsibilities of each object and decide how classes will interact with each other."

Carrying out an object-oriented analysis turned out to be harder than switching to SmallTalk. "The syntax of the language is not the big thing," Lampl said. "The important thing is learning how to think about objects."

The advantage of building with objects is that they can be used again in future applications. In November 1991, the Orion group decided to use object-oriented programming instead of Sybase's APT tool kit, which then supported only character-based screen interfaces.

To jump-start the Shipment Information System application, Levi Strauss used an object-oriented framework called Facets from Reusable Solutions, Inc. in Portland, Ore. That framework came with a collec-

tion of graphical user interface objects.

Outside consultants assisted in the client/server evaluation process, including a Sybase specialist and a SmallTalk consultant. They helped the Orion team make the transition from Cobol development to object-oriented programming and move from mainframe-based DB2 to Sybase database

servers on Unix machines.

There was an initial learning curve to climb with object-oriented programming, Lampl said, but the DB2 programmers were already familiar with the relational tables used in Sybase.

### In the works

Now that the first test run of client/server technology is nearly done, Levi Strauss plans to build up the Orion team as new applications are identified for develop-

ment. The trials of the initial learning experience will be documented to ease future development.

"We have developed guidelines for all the future pilots to follow," Lee said. "We will definitely retrain in-house staffers to do this, but I see this group as being consultants and trainers at the same time. They will help the developers of the next project, and so on, as the client/server technology fans out [through the company]."

## OPEN INTERFACE

Open Look  
UNIX

Presentation Manager  
OS/2

OSF/Motif  
UNIX, AIX

Microsoft Windows 3.0, 3.1

Macintosh

DECwindows Motif  
VMS, RISC-Ultrix

NEW! VERSION 2.0

### ATTENTION CONSULTANTS!

Increase your sales!

Advertise in Computerworld's annual Consultants Directory for just \$399.

Appears in our Annual Forecast issue on Jan 4.

Ad Close: Dec 7

800-343-6474

x744

### PORTABLE GRAPHICAL USER INTERFACES ACROSS ALL WINDOWING STANDARDS



Neuron Data *Open Interface*™ is an object-oriented, C based, extensible development tool with a layered API and graphic editor that lets you create your user interface once, and have it work across all standard windowing environments. Your applications will support native look and feel across OSF/Motif, Open Look, Presentation Manager, Microsoft Windows and the Macintosh. All without changing a line of code.

Call us today at 1-800-876-4900 ext. 546 to find out why companies like 3M, American Express, AT&T, DEC, GE, IBM, SONY, and Volvo are using *Open Interface*. You'll receive seminar information, product literature and a free comprehensive technical paper. Special VAR and OEM pricing program available. NEURON DATA, 156 University Avenue, Palo Alto, California 94301 Tel: 415-321-4488.

## NEW Products

### Application development tools

Apex Software Corp. has announced Agility/VB, a database manager designed for Microsoft Corp.'s Visual Basic.

Without writing a line of code, users can create database applications by using custom controls, Grid, button, text and picture

controls are included along with a full-featured set of commands. Agility/VB offers a feature called View Editor, a graphical tool that specifies relationships among multiple databases in view. View Editor has the ability to distinguish databases of different formats. The product provides its own native database for variable-structure and variable-length data storage and supports dBase and text file formats.

Agility/VB costs \$189.  
►Apex Software

Suite 401  
1516 Henry St.  
Pittsburgh, Pa. 15213  
(412) 681-4343

Donnay Software Designs has introduced dClip 3.0, which the firm said is a true engine for Clipper, designed for compatibility for the user and offering unsurpassed speed. New support is provided for all third-party replaceable database drivers, giving users a range of file formats to use

in their applications. Other features include built-in command and menu support, a database editor, enhanced browse functions and a "work" system that can save an entire working environment, quit the application and restore everything with a DOT-prompt command. The Clipper 5.01-Compatible Preprocessor is a test preprocessor that commands without having to compile first.

dClip 3.0 costs \$399.  
►Donnay Software Designs  
Suite 200  
20251 Acacia St.  
Santa Ana, Calif. 92707  
(714) 263-1011

Electronic Imagery, Inc. has announced the ImageScale Plus Developer's Toolkit for DOS and Unix applications.

The tool kit now includes the JPEG compression/decompression algorithm. Users can create a fully functional imaging system with items such as enhancement analysis and compression and file management routines. For ease of use and adaptability, the tool kit provides a layered architecture and the company's image processing library. The tool kit's graphics, text and cursor routines in the image processing library, as well as the command line executable programs, are written in C.

ImageScale Plus for DOS costs \$1,995, and Plus for Unix costs \$3,995.

►Electronic Imagery  
Suite 3400  
1100 Park Central Blvd. South  
Pompano Beach, Fla. 33064  
(305) 968-7100

Lexel, a Miero Technology, Inc. company, has introduced Lance+ Version 3.2, a Simple Network Management Protocol (SNMP)-based management system that offers several enhancements such as the Chassis Administrator, a Lance+ tool that allows users to build customized interfaces. The firm said this provides a consistent "look and feel" for any standard SNMP device contained within a chassis on a network. Lance+ runs on Sun Microsystems, Inc.'s SunOS and VMS platforms.

The product costs \$20,950.  
►Lexel  
5065 E. Hunter Ave.  
Anaheim, Calif. 92807  
(714) 680-0100

### Languages

ExperTelligence, Inc. has announced Action 3.0 for the Apple Computer, Inc. Common Lisp (MCL) 2.0. Action 3.0 has 32 bit-clean virtual memory and total control over colors, and it includes all the features of MCL 2.0, all System 7 events and access to MCL 3.2 traps. Improvements include the "connect to" mechanism that allows objects to exchange their values and a "run" option that permits users to automatically execute the application in run mode, assuring them that initialization methods will be correctly executed at runtime, the company reported.

Action 3.0 costs \$595.  
►ExperTelligence  
5638 Hollister Ave., 3rd Floor  
Goleta, Calif. 93117  
(805) 967-1797

# What do you call a training company with all the skill and dynamics of IBM?

Imagine one company made up entirely of technology, management and consulting specialists hand-picked from inside IBM.

A full-service training company that knows first-hand the importance of maximizing the potential of people and technology.

Now stop imagining. And start maximizing.

Because Skill Dynamics is up and running with what could be the industry's widest range of education and training services.

From instructor-led and computer-based training to customized courses—offered at our sites, or yours.

From management and

Plus a long list of continuing education to help you keep your edge—after we've helped you attain it.

Our skills range from education consulting to developing curricula to actually training trainers—all at very competitive prices. We're Skill Dynamics. The first training company to come right out of the blue, to help keep you in the black.

For more information, give us a call: 1-800-IBM-TEACH.

## Skill Dynamics™ An IBM Company

professional skills to quality processes, industrial training and maintenance service skills. From full-blown multimedia classes to mega-system and PC classes,

IBM and Skill Dynamics are trademarks of International Business Machines Corporation.

# THINK BIG. START SMALL.



## EDA/SQL FROM INFORMATION BUILDERS: The Data Access Standard For Client/Server Computing That Grows With You.

### MAKING THE MOST OF YOUR ASSETS

Data is one of the most strategic assets any business can have. Because businesses that utilize data well, will succeed. Businesses that don't, won't.

The trick is knowing how to use your data resources in the most cost effective way.

That's where Enterprise Data Access/SQL (EDA/SQL) as a client/server solution can make the difference.

### OPENNESS, POWER AND FLEXIBILITY

Implementing client/server applications can be tough, particularly when you need to access remote data on diverse platforms.

With EDA/SQL, you have the freedom to access data in over 50 different databases and files, running

on 35 computing platforms using any major network protocol. And there are dozens of applications and tools available from more than 50 leading software vendor partners that support EDA/SQL.

No other SQL solution on the market gives you this much flexibility.

### BIG OR SMALL, IT'S ALL THE SAME

EDA/SQL has the power and the ability to drive the largest enterprise-wide implementation, or to simply connect a single client/server application to a specific data source.

And because there's an EDA/SQL solution for every popular platform, and network protocol, you can use it in the environment of your choice.

Only EDA/SQL has the scalability and configuration

flexibility to meet your client/server requirements both today and tomorrow.

You can start with the EDA/SQL solution you need today. Then, efficiently and economically grow any configuration to meet your changing business requirements. Big or small.

For more information on EDA/SQL, our consulting services and education programs, or to attend a FREE Seminar...

Call 800-969-INFO

In Canada call 416-364-2760



**EDA/SQL**

Information Builders, Inc.

EDA/SQL is a trademark of Information Builders, Inc. 1250 Broadway, New York, NY 10001

# Management

*Tough times create one tribe. The industry's first major survey of IS attitudes reveals a surprising agreement on big issues — from the benefits of PCs to family values.*

EXCLUSIVE  
CW SURVEY

## All TOGETHER now

By Nell Margolis

FRUTAL business conditions and rapid business change have forged a strong bond between the young turks and old guard of corporate information systems.

In fact, a *Computerworld* survey has found that there is little evidence of any major generation gap in IS.

"It's sort of like the arguing about the sexes," says Jack Bush, director of information services at Apopka, Fla.-based Southern States Utilities Services. "There are differences, sure — but for most purposes, they aren't meaningful."

In the first major survey of its kind, *Computerworld* polled approximately 1,400 IS leaders and staffers at U.S.-based companies on a broad range of technological, managerial, sociological and political attitudes.

A predictable split emerged along age lines where opinions were more likely to be shaped by work and life experience. IS folks under 30, for example, showed more optimism about their career paths than did the 40-plus crew. But overwhelmingly, the IS community chimed in together on the key issues affecting their profession:

- The mainframe is fast becoming history; the desktop rules.
- Nobody has enough time, especially people in their 30s.
- IS must weave itself into the businesses it serves. For its part, business must serve its community as well as its customers.
- Outsourcing could be big trouble.
- IS professionals who don't change today won't see tomorrow.

Why the harmonious convergence? Rick McDaniel, IS director at the Oklahoma City-based law firm of Crowe & Dunlevy, P.C., suggests "foxhole psychology" as one key explanation. "Anytime you have a common foe, old differences begin to pale and bonding begins," he says.

And IS personnel are currently confronted on several scores. "For instance, the recession is a great leveler," McDaniel notes. "We're all fighting on that front. Virtually overnight globalization and the lightning pace at which technology changes also come to mind."

So do current trends aimed at recasting how U.S. companies do business, which are forcing IS to rethink and reshape its own role.

### METHODOLOGY

Survey questionnaires were mailed to *Computerworld* subscribers between Sept. 1 and Sept. 29, 1992 and tabulated by IDG Research Services. A total of 1,383 responses were received from IS managers (78.5%) and professionals (21.5%) age 21 to 74 in 20 industries.



The Salvation Army's Randall Haan: 'We've been bitten too many times'

## *"I hate these slick consultants who write that if you're over 50, you're dead."*

Ron Flink • Handy and Harman, Inc.



Take outsourcing: Randall Haan, IS director at The Salvation Army's Cascade Division in Portland, Ore., says he's cautious.

"We've been bitten too many times," he says.

### Mistrust of outsourcing

Several years ago, Haan explains, his organization tried to save money and time by outsourcing a critical business application development project. Unfortunately, he reports, the "company made lots of promises and then changed direction in mid-stream."

Months of stagnation, one lawsuit and "well over \$1 million" later, the project moved back in-house. "It was devastating," Haan says.

Several years into the outsourcing boom, many IS leaders have either lived or heard such stories, or they have heard the siren song of vendors promising to make technology problems vanish overnight. That could explain why respondents of all ages fell almost smack in the middle of the outsourcing road.

Because *Computerworld* recently polled IS professionals on another hot industry issue — re-engineering [CW, Oct. 19] — the current survey did not address that topic. However, that research and new interviews with IS leaders show that opinions here also cluster rather than clash.

"Re-engineering ... isn't just important; it's critical," says Roy Camblin, senior vice president of Wells Fargo Wholesale Services in San Francisco. "It's a challenge that's facing most organizations in this country. And the biggest challenges are the cultural, not the technological."

One of the strongest bonds weld-

ing IS professionals regardless of age, notes New York-based industrial psychologist Laurence Lipsett, is appreciation for technology — an observation borne out in the *Computerworld* survey results. Respondents agree that Cobol is history, mainframes are fading fast, and client/server, local-area networks and desktop applications rule.

Another reason for the widespread sense that "we're all in this together," Lipsett says, is that the age range in IS is narrower than in other professions. Thus, he says,

there is likely to be less of a generation gap.

"Computer technology itself is still relatively new," Lipsett notes. "Generally speaking, no one has had a chance to grow old in IS yet."

Moreover, several experts noted that those who believe age stereotypes — of arrogant young whipper-snappers and recalcitrant old codgers, for instance — may turn up less frequently these days among the ranks of the employed.

"I certainly don't see an IS 'old guard' mired in old ways and averse

to change," said 29-year-old Mark Bowers, software developer at Tucson, Ariz.-based Tucson Federal Credit Union. "If there were such a group, they wouldn't still be here."

### Culture, not birth date, counts

Anecdotal experience and formal studies also support our survey findings. For example, DuWayne J. Peterson, former chief information officer at Merrill Lynch & Co. and now a private consultant, says he recently saw firsthand how few differences exist between older and

## YOU AGREE . . .

### SMALL IS GOOD

The PC and network boom has been good for the IS profession

**Yes**  
87.1%

**No**  
12.9%

### IS EQUALS BUCKS

Information technology is key to a competitive advantage in my organization's field of business

**Yes**  
91.4%

**No**  
8.6%

### BIZ WIZ WANTED

IS needs to be more business-oriented

**Yes**  
91.8%

**No**  
8.2%

### GOVERNMENT AND BUSINESS HAVE WORK TO DO

Business needs to be more responsive to the community and environment

**94.5%**  
AGREE

The U.S. government needs a more proactive technology policy

**91.2%**  
AGREE

Corporations need to be more responsive to family needs

**89.7%**  
AGREE

Information technology is making information workers more productive

**83.1%**  
AGREE

The U.S. has lost its competitive edge

**78%**  
AGREE

Bob Sacka

## Hearts and minds

Several years ago, Guy Ministeri found himself grappling with a gut-wrenching decision an increasing number of Americans face each day: His mother, aging and ill, needed more care than his full-time working hours allowed him to give her: "On the other hand," he says, "I didn't want to put her in a nursing home."

"The best idea," concludes Ministeri—who is director of operations at Stride-Rite Corp.—"was to bring her to work with me." Thanks to Stride-Rite's "Intergenerational Center," he could.

The center, an on-site day care and elder care combination, provides employee relatives at both ends of the age spectrum with professional care and the pleasure of each other's company. It's only one of a broad range of Stride-Rite programs—wellness, fitness, employee assistance, community outreach and a panoply of personal improvement seminars brought in on an outside contract basis—aimed at accommodating employees who rank family concerns as top priority.

The overall initiative, spearheaded in the early 1970s by then-Chairman Arnold Hyatt, is now headed up by family programs director Karen Liebold. Her very position is a declaration of the Cambridge, Mass.-based footwear manufacturer's recognition that the lines between family and work are fading fast.

Computerworld's first-ever IS attitudes survey is proof: Asked what motivates them most in life, a whopping 53.8% of respondents said "family." That's more than twice the 14.8% who made "personal satisfaction" the runner-up.

And IS folks are typical of the general work force population, according to a study compiled last February by The Conference Board. Perception that work/family concerns are compelling and consistent across the board, the report said, is encouraging firms to establish positions like Liebold's. Several hundred U.S. companies reportedly have created work/family management slots during the past two years.

According to Arlene Johnson, Conference Board work force research director, the numbers are expected to keep growing, as are the number of related jobs. "More effort will go toward managing change, dispersing work/family responsibilities throughout the organization and creating synergy with other business functions," Johnson says.

Report co-author Karol Rose adds: "Management wants to make sure that work/family initiatives are linked to the bottom line. —Nell Margolis



younger IS hands.

As head of a blue-ribbon task force researching ways to mainstream IS into business, Peterson asked older team members to select younger representatives from their companies to add a fresh perspective.

As work progressed, Peterson says, project leaders made a surprising—and initially disconcerting—discovery: "Age didn't figure."

"We were struck with how solid the so-called 'young turks' were," Peterson recalls. "They weren't wild-eyed hotheads; they were very confident."

On technological matters, some had expected disagreements between younger desktoppers and older mainframe users. But again, according to Peterson, the younger group showed surprising agreement with the old guard.

Instead of resistance to traditional beliefs, he says, younger team members exhibited diverse views.

"Some felt that older IS models could be worked with; others said, 'No, we've got to throw them out and start over.'"

### No surprise

That experience squares with recent research by STAT Resources, a Brookline, Mass.-based market research firm, which discovered that corporate cultural styles, not age, were a key factor in how IS people think and behave.

In a recent study of reading and buying trends of 400 IS professionals, STAT isolated five main segments: "Warriors" (42%), desktop champions who think strategically and act as business enablers; "Visionaries" (24%), who share Warriors' strategic goals but are skeptical of desktop computing; "Overseers" (21%), underambitious, passionate protectors of the status quo; "Technocrats" (7%)—zealous, aging devotees of cost savings and technology for its own sake; and "Defenders" (6%), ineffective, defensive IS protectionists.

In all groups, age, while a factor, was not a meaningful one, says Susan Ellerin, an

*"It's absolutely imperative for IS to be increasingly embedded in the business units it serves."*

Thomas Charbonneau • Bose Corp.



### FACE TIME

It is important for IS to spend some time working with end users

**Yes**  
99.1%

**No**  
.9%

### FARMING OUT

Information systems outsourcing is a dangerous trend for IS professionals

**Yes**  
60.5%

**No**  
39.5%

### CLOUD

The influence of IS is growing at my organization

**Yes**  
76.2%

**No**  
23.8%

industrial psychologist and STAT president.

"Don't get me wrong, differences between older and younger IS people do exist," McDaniel says. His peers agree: Asked if they see major differences between older and younger IS folk, 81.6% said yes but were not able to describe the differences clearly.

### Are we not PC worthy?

Consider, for example, the mixed responses on the following topics:

- **Personal computing.** Is a PC-savvy younger generation crowding out an older, mainframe-oriented group? Not if you judge by Jim George, IS director at Pittsburgh-based Ohio Valley General Hospital. George would like to inoculate the hospital

against what he calls "Biggest Calculator Syndrome."

"The PCs themselves can do just about anything these days, but the users aren't taking advantage of that. They use them for word processing, for spreadsheets," he says. "I see a lot of PCs out there getting used about an hour a day; that doesn't make a whole lot of sense."

In fact, George says he suspects that the desktop revolution exists largely in the mouths and minds of "a lot of people who are trying to fool themselves to justify all the money they've put into PCs" from which they are realizing scant payback.

Typical old-fogey talk? Maybe—but George is 34 years old.

- **Professional skills.** While 80.5% of survey respondents said they see big differ-

## GENERATION MAP

Although over-40 and under-40 IS professionals agree on many issues, respondents noted several differences, notably in financial and career hopes

## Under 40

- More open to change, adaptive
- Better trained and up-to-date
- PC-oriented and experienced
- More loyal to their companies
- Optimistic about their financial prospects for the next decade
- More confident that young people can be IS innovators

## Over 40

- Slower to accept change, less flexible
- Well-rounded and experienced
- Mainframe-oriented and experienced
- Less convinced that IS offers "an excellent career track"
- Less convinced that today's children will have a better quality of life than their parents

ences in the skill set of younger and older IS pros, it was less clear which group's skills were seen as superior.

"Younger developers tend to lack discipline," George says. A third-generation developer who looks back on his training on an old Univac as rigorous and beneficial, George wonders whether the generation that grew up with PCs and user-friendly interfaces has traded depth for "cleverness—which doesn't really cut it in IS."

But Ron Flink, director of IS at Rye, N.Y.-based specialty metal products manufacturer Handy and Harman, Inc., concedes that newer technologies are passing some old guard members by. "I hate these slick consultants who write that if you're over 50, you're dead," says Flink, 59. "You're not. But there are some people who can't bridge the gap."

He continues, "Some of the old IS professionals try to equate mainframe technology with all that's being done with, say, client/server. They think it's all the same, but they're wrong. You don't just take out a template and write pages and pages of Cobol code."

• **Company loyalty.** While most respondents under 30 agreed that staying loyal to one company is key to advancing an IS career, 59.8% of their colleagues in the 30-39 age bracket, and an equal percentage in the 40-plus group, disagreed. The gap, at last? Not necessarily.

One's stand on company loyalty, notes 30-year-old Susan Alexander, probably has more to do with your birth than your birthday.

"If you find yourself in an organization where IS is undervalued—and that unfortunately accounts for the majority of them—you've got to move on," says Alexander, director of IS at The William and Flora Hewlett Foundation, a nonprofit organization located in Menlo Park, Calif. Sticking with such an employer, she adds, "isn't loyalty; it's martyrdom."

If IS professionals of all ages generally agree on the state of their profession, they

## EXCLUSIVE CW SURVEY

are even more solidly united on where it should be headed.

Of 40 questions asked by *Computerworld* ranging across categories from quality of life to technology, business, life in IS and professional goals, two topics drew much stronger agreement than any others: the importance of spending time working directly with end users and business' need to be more responsive to the community and the environment.

"It's absolutely imperative for IS to be increasingly embedded in the business units it serves," says Thomas Charbonneau, manager of corporate information services/business administration at Framingham, Mass.-based audio equipment manufacturer Bose Corp. "And I think this is universally noted."

And the urgency of working directly with end users, he adds, goes well beyond the realm of being politically correct. While preaching about melding with user departments still outstrips practice, Charbonneau says, the talk/action gap is closing quickly.

"To really do our job, we have to know and serve the business users' latent needs," he says. "That's not something you can get from the outside looking in."

### Relying on users

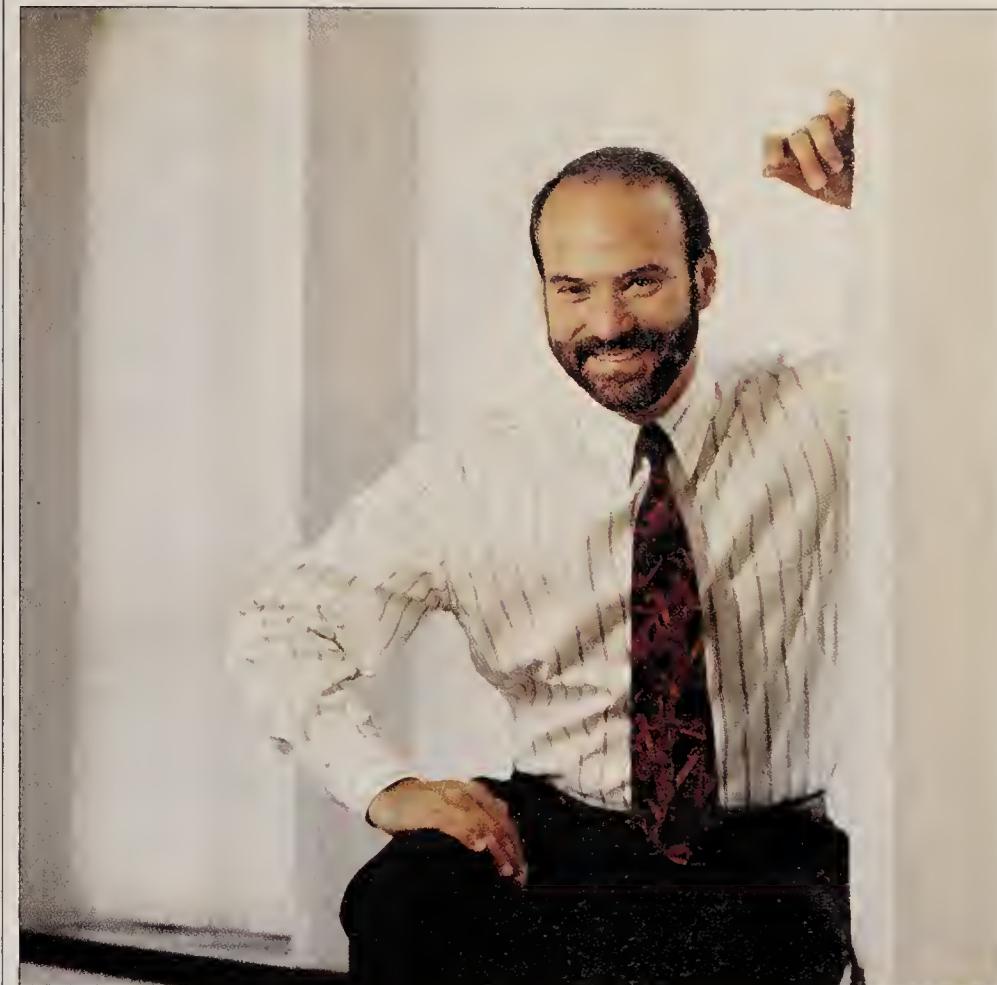
Charbonneau says Bose got user religion about five years ago, when the demands of a mammoth new manufacturing resource planning system implementation forced an IS team to work constantly with—and take direction from—the manufacturing group in charge of the project.

Today the team, now ensconced in the manufacturing unit, has grown from its original complement of seven IS professionals to approximately 20, complete with its own team leader.

And it's not alone. The team's success has spawned three more mixed IS/business teams, resident in the engineering systems, direct marketing and sales and marketing business units.

*"I see a lot of PCs out there getting used about an hour a day."*

Jim George • Ohio Valley General Hospital



BRUCE ZAKK

### PLATFORMS

Mainframe computers are dinosaurs

**Yes**  
43.7%

**No**  
56.3%

### HOT TECHNOLOGIES THAT AFFECT YOUR CAREER

Rated on a scale of 1 to 4, where 1 is not important and 4 is very important

PC application software	3.92
LANs	3.90
Client/server computing	3.76
GUIs	3.52
Portable and remote computing	3.50
Object-oriented technology	3.21
Multimedia	3.04
CASE	3.02
Cobol programming	2.37

The lesson is clear: Success at interweaving business goals and technology will be met more easily when IS professionals are seen as valued insiders.

Sadly, even in Silicon Valley, many respondents noted, this acceptance is still rare. In fact, many said that if a stubborn attitude gap exists, it's between IS and the rest of the business, not between older and younger computing professionals.

But there's good news: 76% of those polled say the chasm appears to be narrowing. Craig Muranaka, chief information officer at Culver City, Calif.-based E. V. Roberts & Associates, Inc., an adhesives manufacturer, says he thinks the answer to closing it completely lies in popular culture.

"All it would take would be a new Tom

Peters to write a book about the critical relationship between IS and business, hit the talk show circuit and become a media darling," says Muranaka, referring to the management consultant whose blockbuster *In Search of Excellence* fueled the mid-1980s entrepreneurial boom.

Beyond that, Muranaka adds, one more thing is crucial for bringing both camps together: "Guts—on both sides of the IS/business equation."

"There are blue sky opportunities out there, if we only take them," he says, citing the near-legendary IS-fueled success of Federal Express Corp. "There was somebody out there who was acutely aware of the use of technology—and somebody who didn't flinch when it came to signing checks."

*Our Computerworld IDC White Paper was innovative and effective in delivering our message to readers that make a difference.*



*"With the help of over 250 leading software technology vendors and users, the Object Management Group is shaping the rules for a new information technology.*

*"Winning in today's global market requires information sharing across the enterprise. To this end, the OMG is working to establish rules that promote the concept of open architecture and standardized interfaces. Rules that enable users to access and combine a wide variety of products. And rules that support the kind of open system integration that encourages multi-vendor systems. All the components necessary to share information enterprise-wide.*

*"The Computerworld White Paper Program was a real winner for us. The OMG, Computerworld and IDC teamed up to publish 'Object Technology: A Key Software Technology for the '90s,' which is helping us educate the IS market on our mission.*

*"Object technology's place in the computing environment is well-established and growing rapidly. That's why the Computerworld White Paper Program is a key part of our strategy to reach information systems management, the buying power in today's market."*

Christopher Stone  
President  
The Object  
Management Group



**THE COMPUTERWORLD WHITE PAPER PROGRAM**  
*An innovative marketing tool for selling your technology solution*

375 Cochituate Road, Framingham, MA 01701-9171  
(508) 879-0700

# Product Spotlight: 486 PCs

## BEST BUYS

*Deals abound, but beware of pitches that provide more problems than value*

**P**rices on 486-based PCs are falling so fast that buyers are having trouble keeping track of this week's low-cost vendor. It should be simple to cut an incredible deal on a PC. Right?

Well, maybe.

No doubt about it, you can pick up a 486 for cheap. But combine the volatile pricing with the abundance of processors, vendors and channels, and many buyers are left scratching their heads. Name brand or third-tier clone? 486DX2 or 486SX? Mail order or retail?

The bottom line is, it takes more than price to make an incredible deal on 486s.

Users have to strike a careful balance between price and the need for a quality system that does exactly what their applications require. What constitutes a "Best Buy" depends on what your needs are and how you plan to use your PCs.

Are your stand-alone end users clamoring for a box that will let their graphical user interface fly? Will your 486s serve as the engines for a companywide, mission-critical database application? Or do your bean counters need a coprocessor to crunch their spreadsheets?

How well a given system will meet each of these needs depends on the type and speed of the processor as well as the quality and compatibility of the components.

Knowing *what* to buy is only half the battle; you must also know *where* to buy. Can you count on the goods from a storefront operation, and will service be sufficient from a mail-order vendor? Where (and how) can you leverage the volume of your purchase for the best discount?

In the following pages, you'll find practical advice — quality checklists, caveats, consultants' choices — for purchasing the 486 that matches your power and reliability requirements without exceeding your spending limits. Users who've taken the plunge also share their experiences. A leading consultant even cautions users to look twice before buying a 486 at all.

In short, we've rounded up the practical information you'll need to make an informed decision when buying a 486 PC.

And still save a bundle.



FRANK O'NEILL

### What counts most

150 USERS, WHO RATED THE TOP 486 PCs IN BUYERS' SCORECARD, RANKED THE FOLLOWING CRITERIA AS MOST IMPORTANT IN MAKING PURCHASING DECISIONS



1. Software compatibility
2. Reliability
3. Hardware compatibility
4. Value for the dollar
5. Performance
6. Vendor responsiveness
7. Technical support
8. Ease of maintenance
9. Configurability
10. Ease of setup

### Shifting values

PCs users are shifting their buying priorities.

In Buyers' Scorecard a year ago, they rated reliability as the most important requirement and placed vendor service and support near the bottom of their lists. Performance was fourth last year, followed by value for the dollar, ease of use and availability of upgrade options.

### CONTENTS

- How vendors can cut corners on 486 bargain brands. Pg. 156
- Gateway 2000's 486 PCs wow users in Buyers' Scorecard survey. Pg. 160
- Why you shouldn't skimp when buying a server. Pg. 161
- Lab Report: The fastest 486s measured by the Khornerstone. Pg. 162
- Special considerations for volume 486 PC buyers. Pg. 162
- The best prices you can get on the street. Pg. 163
- Column: Stephen Rood says you might not need a 486. Pg. 164
- Users talk buying strategies and priorities. Pg. 166

# Discover something possible with an

Stare here for 15 seconds.



# ing never before \$890\* terminal.

Now stare here.



Introducing the WY-325 color terminal for only \$890. (Yes, you can believe your eyes.) It's ergonomically advanced. It emulates general-purpose terminals such as DEC, ADDS, TeleVideo and, who would have guessed, Wyse. And the WY-325 replaces a monochromatic terminal without making changes at the host computer or to the application. Although this list of benefits could go on, the price alone should color your thinking about terminals. If so, call your local distributor or call us at 1-800-GET WYSE.

**WYSE**  
1 800 GET WYSE

# Beware the bargain PC

By Andrew M. Seybold

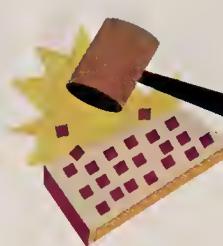
Though this may be the best time to find a bargain 486 PC, it's also the best time to end up with a system with lower quality components than you need if you aren't careful.

In addition to the "name" brand PCs, there are literally hundreds of vendors assembling systems and selling them through every type of computer outlet. Companies with sufficient PC support capabilities and resources can certainly find good deals.

Many storefronts offer quality products at very attractive prices, and some even offer the "build to order" type of sale where you discuss your requirements and they assemble the various bits and pieces into a system.

Some of these systems might be considered wise purchases for the savvy PC buyer. But this channel is not for every company, and caution is needed when dealing with vendors and suppliers.

Only those who feel comfortable working under the hood of the system (or who have a technical



## Bang the keyboard

**It may seem like a small point, but don't forget to try the keyboard for feel. Many of these low-end systems include a "throwaway" keyboard. After the first week of operation, you will be back at the store upgrading it to one that feels right.**

support staff with enough expertise and manpower) should venture into this tier of vendors. The "garage door opener test" is an informal way to determine whether you can safely purchase a system through these channels:

- If, when your electric garage door opener quits working, you pick up the phone and call a repair person, you should avoid the bargain, no-name sellers and deal with established or name-brand systems that include extended warranties.
- If you experiment with the garage door opener — changing the battery in the remote control, looking for obvious obstructions — then you are a prime candidate for not only the "full service" vendor but also the vendor/retailer that offers systems with less recognizable names, which you might want to purchase and configure to your own needs.
- If you do not stop working on your garage door opener until you have dismantled it and fixed it, then you can walk into any store and purchase pieces and parts and "roll your own" systems, oftentimes at considerable savings.

## Quality control

When purchasing a computer that has been assembled in front of your eyes or that has been preconfigured but does not include a familiar brand name or warranty beyond the sellers' own, you should check and verify the following items:

- **Power supply.** What is the capacity of the power supply? Many low-end products cut corners and provide supplies that will not support more than the basic system. Add-on cards or drives will fry the system.
- **Case construction.** Is the metal case rigid enough to support a monitor? Does the computer chassis slide in and out easily, seating properly? When the system is assembled, are add-in cards installable without being either forced into the connector and the board and/or bent to line up with the slots at the back of the case?
- **Documentation.** Is there any? Is it just a series of small pamphlets on each individual component, or is it "systems-oriented," helping you understand how the pieces work together?
- **BIOS.** Finally, check the BIOS. If it is from one of the major vendors — Phoenix Technologies Ltd., American Megatrends, Inc., Quadtel or Award — chances are you will not encounter any surprises as far as systems integration is concerned. If there is no name or an unfamiliar name on the BIOS, the safest bet is to pass on the system.

Many buyers do not try to insert an add-in card until they buy the machine. Then they find out that the generic metal case and the motherboard do not align properly, making it difficult, if not impossible, to add cards into vacant slots.

- **Keyboard.** Try the keyboard for feel. Many of these low-end systems include a "throwaway" keyboard. After the first week of operation, you will be back at the store upgrading it to one that feels right.

• **Monitor.** Look at the monitor specifications closely. If the specifications for a Video Graphics Array (VGA) or Super VGA monitor do not include dot pitch specs, or if the specs state that the dot pitch is higher than .28, do not buy the monitor. Typical cheap monitors usually

## Lowdown on 486 chips

Are you confused by the alphabet soup of 486 chips that are on the market? Here's a quick primer to help keep them all straight and prevent you from buying a DX2 when you want an SX or an SLC.

► **Speed is the chief concern.** From the user's perspective, speed is the primary difference among these various offerings: DX2 systems are faster than DXs, followed by SXs and then SLCs. (Cache size and other variables can affect this hierarchy.)

Within each chip type, a higher clock speed obviously yields faster processing.

► **Coprocessors count.** Some software, most notably Autodesk's, Inc.'s AutoCAD, requires a coprocessor; users need to double-check whether their applications can run on the Intel Corp. 486SX, which has no built-in coprocessor.

► **Why the DX2?** The DX2 works twice as fast inside as it does outside. For example, the 33/66-MHz DX2 "thinks" at 66 MHz but communicates with the rest of the PC as if it were a regular 33-MHz chip.

The advantage of such a chip is that it can work in a system designed for a 33-MHz processor. Users can upgrade a 33-MHz DX processor without modifying the other system components, and vendors can put out a DX2 system without having to design it from the ground

up — theoretically passing on some research and development savings to the user.

### ► The Cyrix conundrum.

The Cyrix Corp. 486SLC has the same pin configuration as a 386 chip, but it handles software in the same manner as a 486. Competitors say the Cyrix chip is not a true 486 and is mislabeled.

The bottom line for users is this: All other things being equal, a 486SLC system will be faster than any 386-based PC and slower than an Intel 486-based system, according to Michael Slater, editor of the "Microprocessor Report."

As to whether it's "really" a 486, Slater says, "It's certainly different from an Intel 486, but it's a gray area. If I have a very fast two-door sedan, can I call it a sports car?"

### ► The "crippled DX" controversy.

Detractors initially protested that the 486SX chips were full-fledged 486DX processors with the internal math coprocessor simply disabled. That tactic allegedly gave Intel an opportunity to bilk users by later selling them an additional external coprocessor for a higher total cost.

The original 486SX chips were in fact altered DX chips, "but that was just a time-to-market issue," according to Slater.

The SX processors currently shipping from Intel are redesigned, with the internal math coprocessor completely eliminated from the die.

## Brands to consider

TOP 486-BASED PC BRANDS SELECTED BY CONSULTANTS AND VARs INTERVIEWED BY COMPUTERWORLD

### "Expensive but worth it" servers and stand-alone systems

Acer America Corp.  
AST Research, Inc.  
Compaq Computer Corp.  
Digital Equipment Corp.  
Dell Computer Corp.  
Hewlett-Packard Co.  
IBM  
NCR Corp.  
Netframe Systems, Inc.  
Tricord Systems, Inc.

### "Cheap but good" servers and stand-alone systems

Acer America  
AST Research  
Compaq  
CompuAdd Corp.  
Everex Systems, Inc.  
Galaxy Corp.  
Gateway 2000, Inc.  
Leading Edge  
NCR  
Northgate Computer Systems, Inc.  
Tandy Corp.  
Wyse Technology, Inc.  
Zeos International Ltd.

have a dot pitch spec of .31 or even .33.

Also, make sure that the video adapter card and the monitor are compatible. Many times a video card will be included that does not properly support the monitor. If the monitor is capable of Super VGA or Extended Graphics Array resolutions, make sure the video card either comes with 1M byte of random-access memory or that it can be upgraded with plug-in memory.

► **Documentation.** Is there any? Is it just a series of small pamphlets on each individual component, or is it "systems-oriented," helping you understand how the pieces work together?

► **BIOS.** Finally, check the BIOS. If it is from one of the major vendors — Phoenix Technologies Ltd., American Megatrends, Inc., Quadtel or Award — chances are you will not encounter any surprises as far as systems integration is concerned. If there is no name or an unfamiliar name on the BIOS, the safest bet is to pass on the system.

The quality of the system is not the only important issue. The longevity of the company is also worth consideration. If the systems you purchase are from a small retailer or single-location dealer and the only warranty being offered is directly from that dealer, you should ask the dealer how long it has been in business under the same name and in the same location.

It is better to spend a few extra dollars than to return a "bargain" system to the store — only to find out it is now in the pizza business.

Seybold is editor-in-chief of industry newsletters "The Outlook on Professional Computing" and "The Outlook on Mobile Computing."

“I can’t work my VCR  
and they’re expecting  
me to understand this?”

—Richard Link, Administrative Assistant

“This was a big investment.  
I’m still waiting  
for the big return.”

—Peggy Turner, CFO

“I thought you said  
these were going  
to increase productivity.”

—Greg Collins, Office Manager

# Presenting a company created by

During the 1980s, personal computer use increased by over 5000%. Even so, some industries saw productivity increase by as little as one percent.

Surprised? Probably not, if you have been listening to the complaints from people around your office. Most often, you hear that computers are difficult to work with or too hard to learn.

That's where we come in. We're ExecuTrain, the largest computer training company in the country. ExecuTrain has over 65 locations in the U.S. and five locations in the United Kingdom and Mexico. We've grown this large by helping companies like yours get the most out of their PC or Macintosh



*These should be tools of the trade, not obstacles. Whether you work on a PC or a Macintosh, we'll teach you how to get the most from your software.*

We offer over 125 different courses. Here are just a few of them:  
Introduction to Computers  
Overview of PCs  
Microsoft Windows™  
DOS™  
Microsoft Word  
Word for Windows™  
MultiMate Advantage IV™  
WordPerfect™  
Microsoft Project  
PageMaker™  
Ventura Publisher™  
Paradox™  
dBase IV™  
Microsoft Excel™  
Lotus 1-2-3™  
Freelance™ for Windows™  
Harvard Graphics™  
Quattro Pro™  
And many more.

computers.

What's our secret? It's actually pretty simple. We figure if we design the ExecuTrain course manuals to take things concept-by-concept and also hire some of the best instructors in the business, we'll end up with a training program that can't be beat.

Let's say you were going to take one of our classes. The first thing you'd notice is that we usually only allow 10 students in each class. That way, if you have a question

about something, our instructor can be by your side in a flash. And all our rooms come equipped with computers, an overhead, a markerboard, as well as a special projector that shows the instructor's computer on a large screen.

We'll be the first to tell you that we buy some of the most advanced equipment for our classrooms. Even so, our most valuable classroom features can't be bought in a store. They're our instructors. And each one is hired based on his or her ability to do one thing: Communicate. After all, we can teach anyone to be an expert on a computer. But being able to communicate to a roomful of students is a talent that only a few people have.

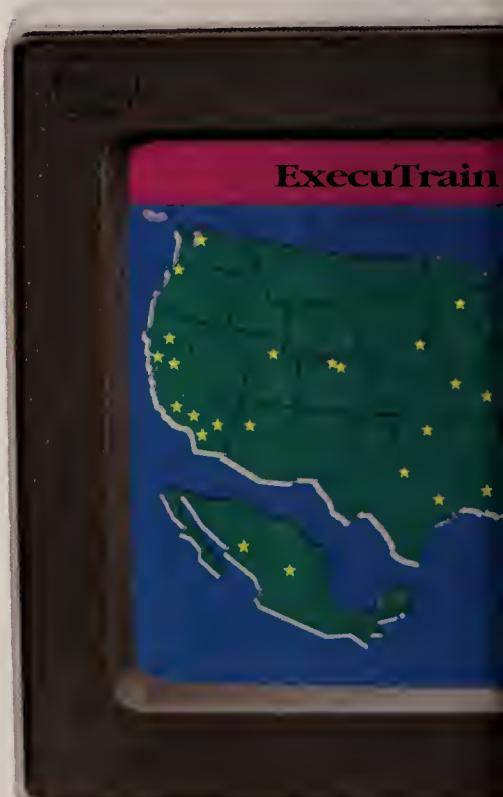
Once our instructors have introduced you to your equipment, they'll introduce you to our courseware. There is a diskette for you to use in your practice sessions and a course manual that makes learning programs such as Lotus 1-2-3™ as simple as learning your ABCs.

One of the best things about our course manuals

*We've spent years developing an international system of computer training centers designed to help you get the most from your computer software.*



*When it comes to clear course manuals, ExecuTrain wrote the book.*



# puter training popular complaint.



*Our instructors are hired based on how well they communicate. You can count on being taught by an expert with a gift for clear, patient instruction.*

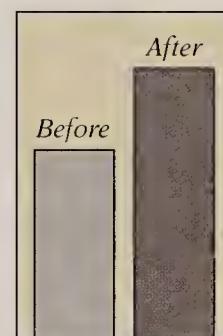
ability to work your way inside and out of our computer software. The second will be our diskette and course manual. And the third will be our telephone number, which you can use as often as you like when you need one of our experts to refresh your memory about the software you were once trained on.

is that each page covers one single concept. No long-winded computerese here. Just straight talk about whatever it is you're working on.

By the time you're through with the ExecuTrain training program, you'll walk out with three things. The first will be the

ability to work your way inside and out of our computer software. The second will be our diskette and course manual. And the third will be our telephone number, which you can use as often as you like when you need one of our experts to refresh your memory about the software you were once trained on.

Our training program also includes our money-back guarantee. It says, in plain English, that if you're not satisfied with the results of our program, we'll offer you free refresher courses until you're satisfied, or your money back. Guarantees like



*Independent research tells us that over 70% of our customers notice at least a 30% increase in productivity for inexperienced users after only one day of computer training.*

that don't come along very often.

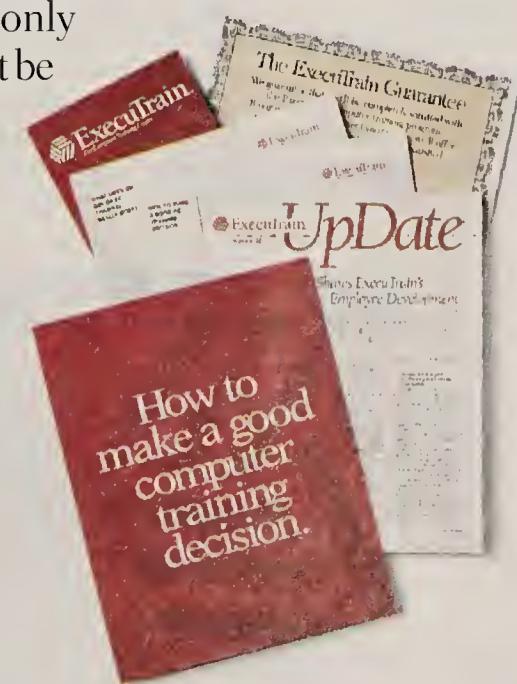
Which is just one more reason to pick up your phone and give us a call. We'll send you a free Computer Training Productivity Package that includes a checklist on how to make a good computer training decision, plus a brochure, a schedule of classes in your area, a newsletter and a copy of the ExecuTrain Guarantee.

What are you waiting for?

We're ready to help you get the most from your PC or Macintosh. So sign your office up for one of our programs. And before you know it, the only words you'll hear won't be complaints. They'll be words of praise.



*Our guarantee\* says, plain and simple, that if you're not satisfied with our program, we'll offer you free refresher courses, or your money back. We also have unlimited phone support in case you have questions about the software you were trained on.*



**ExecuTrain**  
The Computer Training Leader

1-800-535-9479

©1992 ExecuTrain Corporation. All Rights Reserved. ExecuTrain and the ExecuTrain logo are registered trademarks of ExecuTrain Corporation. Lotus 1-2-3 is a registered trademark of the Lotus Development Corporation. All other brand and product names are trademarks or registered trademarks of their respective owners. \*See the ExecuTrain Guarantee for details.

# Buyers' Scorecard



## Mail-order vendors prove their point

By Derek Slater

DIRECT-SALES PC vendors showed how far they have come since the days when the mail-order channel was considered a risky way to buy. In the Buyers' Scorecard poll on 486-based PCs, corporate users gave the highest satisfaction scores to Gateway 2000, Inc. Overall, mail-order vendors took the Top 2 places ahead of AST Research, Inc., Compaq Computer Corp. and IBM, which have traditionally worked through reseller channels.

In particular, the direct sellers earned significantly higher scores in the area of value for the dollar. However, IBM's new ValuePoint line and Compaq's hot-selling ProLinea systems, which are too recent to have had an impact on this survey of currently installed systems, indicate an increasing willingness on these vendors' part to compete on pricing.

Gateway 2000's 486-based systems topped the ratings with an overall score of 85, two points ahead of Dell Computer Corp. and followed by AST Research (82), Compaq (80) and IBM (78).

Some of the vendors produce several different lines of PCs with 486-based models. For example, Compaq 486 systems include various DeskPro desktop models, SystemPro servers and others. The response base for each vendor included users of any 486-based system which that vendor produces.

Most of the respondents (68%) said they are using stand-alone models rather than servers, however.

Gateway 2000, which is based in North Sioux City, S.D., was the No. 2 vendor in terms of 486 units shipped in 1991, with strong results also expected for 1992, according to Bruce Stephen, an

analyst at International Data Corp. The company rose to prominence in the past few years based partly on its low-cost producer status.

Gateway 2000's systems earned the highest score in value for the dollar but also posted good marks in reliability, compatibility and performance. In verbatim responses, a number of users mentioned service as a relative weakness.

Dell users gave their systems high marks in software and hardware compatibility and reliability. Surprisingly, Dell earned lower scores in responsiveness of vendor service — an area the company prides itself on.

AST Research users cited their systems' ease of setup and variety of upgrade options as particular strengths.

Compaq respondents — most of them DeskPro users — said they liked the systems' reliability but indicated relative dissatisfaction with the company's service and support. They also criticized Compaq's use of proprietary parts, which they said make the systems difficult and expensive to maintain.

Similarly, users said IBM's Personal System/2 PCs tended to be reliable performers. The primary complaints stemmed from pricing issues: IBM's lowest rating was in value for the dollar.

Buyers' Scorecard records users' satisfaction with their installed technologies. Users assigned 1-to-10 ratings based on their satisfaction with their 486-based PCs in 13 specific categories. Users also rated the importance of each category.

All 13 categories were factored into the final scores. The scores for each product in the six most important categories are listed in the tables below. (See the methodology on the following page for a complete description of the scoring process.)

### 486-based PCs

Total scores reflect user ratings for 13 measured areas, weighted by user-assigned importance. Response base: 150 total respondents (30 per product).

TOTAL POSSIBLE SCORE **100**

MEAN SCORE **82**

PRODUCT	HIGHEST RATINGS	LOWEST RATINGS
<b>Gateway 2000</b>	<ul style="list-style-type: none"> <li>• SOFTWARE COMPATIBILITY</li> <li>• HARDWARE COMPATIBILITY</li> <li>• VALUE FOR THE DOLLAR</li> </ul>	<ul style="list-style-type: none"> <li>• VENDOR RESPONSIVENESS</li> <li>• UPGRADE OPTIONS</li> <li>• TECHNICAL SUPPORT</li> </ul>
<b>Dell</b>	<ul style="list-style-type: none"> <li>• SOFTWARE COMPATIBILITY</li> <li>• HARDWARE COMPATIBILITY</li> <li>• RELIABILITY</li> </ul>	<ul style="list-style-type: none"> <li>• UPGRADE OPTIONS</li> <li>• VENDOR RESPONSIVENESS</li> <li>• TECHNICAL SUPPORT</li> </ul>
<b>AST Research</b>	<ul style="list-style-type: none"> <li>• SOFTWARE COMPATIBILITY</li> <li>• UPGRADE OPTIONS</li> <li>• EASE OF SETUP</li> </ul>	<ul style="list-style-type: none"> <li>• VALUE FOR THE DOLLAR</li> <li>• DOCUMENTATION</li> <li>• CONFIGURABILITY</li> </ul>
<b>Compaq</b>	<ul style="list-style-type: none"> <li>• SOFTWARE COMPATIBILITY</li> <li>• HARDWARE COMPATIBILITY</li> <li>• MEMORY CAPACITY</li> </ul>	<ul style="list-style-type: none"> <li>• VALUE FOR THE DOLLAR</li> <li>• TECHNICAL SUPPORT</li> <li>• VENDOR RESPONSIVENESS</li> </ul>
<b>IBM</b>	<ul style="list-style-type: none"> <li>• SOFTWARE COMPATIBILITY</li> <li>• HARDWARE COMPATIBILITY</li> <li>• PERFORMANCE</li> </ul>	<ul style="list-style-type: none"> <li>• VALUE FOR THE DOLLAR</li> <li>• UPGRADE OPTIONS</li> <li>• DOCUMENTATION</li> </ul>

#### Gateway 2000

RESPONSE BASE: 30 USERS



LIKES: "The price."

DISLIKES: "The customer service is unsatisfactory."

Would you buy the product again?

LIKELY  
REASON:  
Reasonable  
price, good  
value

**29**

#### Dell

RESPONSE BASE: 30 USERS



LIKES: "Quality of machine and quality of service."

DISLIKES: "Needs more power for a low price."

Would you buy the product again?

LIKELY  
REASON:  
Reasonable  
price, good  
value

**30**

#### AST Research

RESPONSE BASE: 30 USERS



LIKES: "Well-designed and quality-fabricated product."

DISLIKES: "High price—product not on cutting edge."

Would you buy the product again?

LIKELY  
REASON:  
Compatibility,  
reliability

**7**

UNLIKELY  
REASON:  
Better  
products  
available

Ratings are based on a 1-to-10 scale, where 10 is best.

Responses are based on the most frequently stated answers. Quotes are selected from users' responses.

Reasons are based on the most frequently stated answers.





# Servers: Not the thing to skimp on

By Andrew M. Seybold

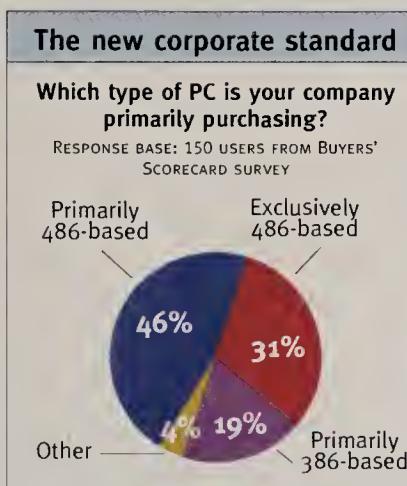
THERE IS one place in your enterprise where it makes little sense to take any risk on a "bargain" 486: the network server. While a high-priced, high-quality server will not guarantee you a trouble-free network, it will certainly go a long way toward providing you with more uptime — the most important commodity in the network.

Don't cut corners, and don't purchase a system that uses oddball disk drives or other components that cannot easily be replaced. Other items to check include the rating of the power supply, the total memory capacity of the main board, the number of slots for add-in cards and the number of bays for add-in storage and backup devices. This truism applies more for servers than for most other PCs: You cannot have too much speed, too much storage or too much memory. If there is going to be a bottleneck anywhere, it will be in the server.

You can employ a desktop PC as a server; however, the high-end products designed for server use permit

a wider range of expansion options, more memory and more hard disk space.

You will pay more for a high-end server, though. Compared to today's low-end desktop price wars, these systems have dropped in price very little during the past year. In



fact, just before IBM announced its new Personal System/Valuepoint desktop systems, it raised its prices on high-end PCs and servers.

With the higher prices, however, come a number of other advantages

to purchasing a PC that has been "hardened" for server duty.

Typically, these systems have larger power supplies (250 watts or more) and more hard disk bays, CD-ROM, tape backup systems and expansion slots than a typical desktop system.

Many of these systems can be equipped with a pair of same-size disk drives so that they can perform mirroring. That is when both drives run at the same time and record the same data. If there is a failure on one, the data is still intact on the other. Tape backup or mirroring is critical for a server. In some companies, when a network server goes down, the employees go home, as they literally cannot perform their work activities.

As networks grow in size and complexity, many companies are using multiple servers. The first split is usually necessitated by the number of users on a system. If one department has a need for heavy, server-based use, this can slow down the network for other users.

In this case, the options include splitting the network into sections

and adding other servers with gateways between them or splitting the server functions. Some users configure one server for printing only, one for communications and one for programs and data.

Many of the systems designed for the low-end market can be used for servers, but again, the buyer has to make sure that the systems can handle the requirements of a server and can withstand the continuous duty cycles necessitated for them.

## Multiprocessor servers

Several firms are touting the use of multiprocessor-based servers for networks. At this point, the leading operating systems do not support the management of multiple processors within the same machine.

As is the case with all generalizations, there are times when a multiprocessor-based server makes sense. However, at present, these units require lots of individual configuration and attention to detail to function properly. For now, two separate single-processor servers, tied together via a gateway, makes sense in most cases.

## Mini server

Can you get by with a desktop PC as a server? The answer is yes, especially if yours is a small network (10 to 15 users).

In truth, any desktop PC can be configured as a server for network applications. However, most vendors offer products that, according to them, are better suited for servers than their standard desktop offerings.

Overall, though, remember that the server is the heart of the network and will usually be required to provide uninterrupted service — in most cases, 24 hours a day, seven days a week.

## Vital statistics

Profile of users who rated these products  
RESPONSE BASE: 150

### Primary operating system

DOS only	54%
Windows	27%
OS/2	13%
Other	5%
Unix	1%

### Clock speed of processor

33 MHz	65%
25 MHz	15%
50 MHz	11%
Other	6%
20 MHz	2%
66 MHz	1%

### How long have you used this product?

More than 24 months	17%
19-24 months	11%
12-18 months	34%
7-11 months	13%
4-6 months	14%
0-3 months	11%

## BUYERS' SCORECARD METHODOLOGY

User names were obtained from nonvendor sources. First Market Research Corp. in Austin, Texas, conducted the survey and tabulated the results.

To compute each overall score, perform the following: 1) Multiply the product's score in the first category by the user importance rating for that category to obtain the weighted score. 2) Repeat the process for all remaining categories. 3) Average the resulting figures for the average weighted score. 4) Convert the average weighted score to base 100; the ratio of the average weighted score to the average user importance is equal to the ratio of the overall score to 10. Numbers are rounded off where necessary.

Computerworld thanks the following for their assistance: CW Database Division; Bruce Stephen, International Data Corp.; Computer Intelligence/Infocorp.

## Compaq

RESPONSE BASE: 30 USERS

8.8	Software compatibility
8.6	Hardware compatibility
8.5	Performance
8.4	Reliability
7.6	Vendor responsiveness
7.1	Value for the dollar

**LIKES:** "Upgradability, overall reliability and performance."

**DISLIKES:** "Slow technical support."

### Would you buy the product again?



## IBM

RESPONSE BASE: 30 USERS

8.4	Software compatibility
8.2	Hardware compatibility
8.1	Performance
8.0	Reliability
8.0	Vendor responsiveness
6.3	Value for the dollar

**LIKES:** "Reliability and IBM service."

**DISLIKES:** "Poor price/performance ratio."

### Would you buy the product again?



## Ratings in order of importance

Users rated the following categories on a scale of 1 to 10, where 1 is least important and 10 is most important

RESPONSE BASE: 150 USERS

9.2	Software compatibility
9.1	Reliability
9.0	Hardware compatibility
8.6	Value for the dollar
8.6	Performance
8.5	Vendor responsiveness
8.3	Technical support
8.2	Ease of maintenance
8.1	Upgradability
8.0	Ease of setup
8.0	Memory capacity
7.7	Upgrade options
7.5	Documentation

## Where are they?

More than a third of the Scorecard respondents say they are using their 486 PCs in manufacturing settings. Another 8% are in financial services groups, 4% are in education and 3% each are in retail, health care and government. The remainder are in consumer products or transportation companies. All respondents have direct control of, or influence over, PC purchasing at their companies.

# Lab report: Anatomy of the Khornerstone benchmark

Time		Khornerstone Top Scorers			Test Configurations		
(Weight: 30%)		SYSTEM*	SCORE**		MHz	RAM (M bytes)	OPERATING SYSTEM
• Total time to run script that runs 21 benchmarks included in Khornerstone		1. NCR 3445	53,926		ALR	33	8 SCO Unix 3.2
LEADERS		2. Wyse 900CI	34,339		Altos	33	32 Unix 2.1
1. NCR 3445	11,157	3. Microway B3	29,542		AST	33	4 ISC 2.02
2. Wyse 900CI	8,682	4. AT&T StarServer S	24,091		AT&T	33	8 V/3864.2.1
3. Mobius P450ICX	6,232	5. Mobius P450ICX	22,968		Compaq DeskPro	33	12 ISC 2.2
4. AT&T StarServer S	5,937	6. Altos 4500	22,849		Compaq SystemPro	33	10 SCO/MPX
5. Compaq DeskPro L	5,657	7. Compaq DeskPro L	18,722		Microway	50	8 ISC V2.2
		8. ALR p'icache 3314	18,644		Mobius	50	16 ISC V3.2
		9. Compaq SystemPro	17,108		NCR	33	48 Unix V.4
		10. Northgate 433E	16,469		Northgate	33	4 ISC V2.2
					Wyse	25	64 V1386 3.21
Floating point test		CPU Test			Disk I/O Test		
(Weight: 23%)		(Weight: 27%)			(Weight: 20%)		
• Sequential sort 5,000 floating-point numbers		• Sequential sort 5,000 integers			• Build 8M-byte file		
• Fortran Whetstone double precision test; various Whetstone tests		• Fortran sieve tests			• Random read 8M bytes of data		
• Trigonometric function test in C		• Various tests in C (Ackerman, Dhrystone, Fibonacci)			• Sequential reads 1M to 8M bytes of data		
LEADERS		LEADERS			LEADERS		
1. Microway B3	15,734	1. AT&T StarServer	8,901	1. NCR 3445	27,903		
2. Mobius P450ICX	7,897	2. Microway B3	8,854	2. Wyse 900CI	13,271		
3. AST Premium 486/33	7,894	3. Mobius P450ICX	8,845	3. Altos 4500	3,186		
4. Northgate 433E	6,739	4. Altos 4500	8,641	4. AT&T StarServer	3,124		
5. AT&T StarServer S	6,129	5. Wyse 900CI	7,738	5. Mobius P450ICX	2,154		

\* Systems tested by Workstation Labs — not all 486 PC vendors are included.  
\*\* Score is sum of all test components scores.

Source: ARS/Workstation Labs

## Full speed ahead

NCR Corp.'s 3445 system is the fastest 486 machine, according to the Khornerstone, a widely used benchmark that is made up of 21 separate tests consisting of the components at left.

Both NCR and AT&T do well in the benchmark testing because their products were designed as multiuser network servers. If the tests were run in DOS, the results would be half as strong.

The results include only those systems tested by ARS/Workstation Labs.

The Khornerstone benchmark was designed to provide a realistic measurement of comparative performance for both PCs and workstations.

# Cheaper by the zillion

By Andrew M. Seybold

BUYING a high volume of 486 PCs presents its own set of challenges.

Although the customer is king at the moment — even more so when he is purchasing lots and lots of 486s — it is especially crucial in volume agreements to be very clear on exactly what the systems requirements are and what the follow-on service and support services need to be.

Even then, some vendors may try to meet the letter of the law without actually matching all of the buyer's expectations.

## Horror stories

Several companies that have just completed the purchase of a large quantity of machines did not get exactly what they wanted.

In one instance, a company sent out bids for several hundred 486-based systems with Video Graphics Array monitors, DOS 5.0 and Microsoft Corp.'s Windows 3.1 loaded, a large hard disk and 1M bytes of random-access memory in each machine.

The low bidder, anxious for the volume business, provided machines that met the specifications. However, while the vendor supplied the proper monitor (the specifications called for a dot pitch of .28) and the basic system, it cut corners on the keyboards.

Once the PCs were installed, the end users complained bitterly about the feel of the keyboards. In the end, the company had to throw away and replace several hundred inferior keyboards.

In another case, a company purchased several hundred PCs for use on a network running Novell, Inc.'s NetWare. It took delivery of the systems — all from the same vendor and all the identical model number — during a six- to eight-week period.

After installing the first group in the network, the company found that many of the systems received in later shipments were different from ones in the first group. After some investigation, the PC vendor admitted changing BIOS vendors, integrated drive electronics controller vendors and even hard disk vendors on the same model to save a few dollars in the manufacturing process.

One of the systems I tested came loaded with DOS 5.0 and Windows 3.1 but did not include a mouse or even a mouse port. I had to supply my own mouse and attach it to one of the serial ports (thus losing the use of one port).

Another troublesome practice that even major vendors are starting to follow is that of providing all of the software on the hard disk but not shipping any floppy disks. This can be a dangerous situation.

In testing various PCs, I found one system that froze when I installed a 10Base-T network card. Because this was one that

## No longer a sideshow

Results based on 150 respondents who were asked whether they use 486 PCs for mission-critical applications

Yes	62%
No	37%
Other	1%

### Application type (multiple responses allowed)

Spreadsheet	71%
Word processing	71%
Database	51%
Graphics	29%
Engineering	14%
Network management	15%
Project management	13%
Desktop publishing	13%
Financial	12%
E-mail	11%
Manufacturing	5%
Logistics	5%
Scientific	5%
Image processing	3%

Source: Buyers' Scorecard

## 486 PCs

## Power hitters

Some applications demand all the power a PC can bring to bear. Most of these are graphics-intensive applications, and all of them operate better when the processor has some help from a coprocessor.

These high-performance applications include the following:

- Computer-aided design.
- Heavy-duty accounting or numeric modeling software.
- Desktop publishing.
- Graphics imaging packages.
- Industrial-strength drawing and drafting packages.

If high-end applications are in your future, then look for not only a 486DX-based system but also a system that has been optimized specifically for high-performance operation.

The low-end (386-based) systems offered by most of the name-brand vendors are, for the most part, optimized for the processor installed in them. However, this is not always the case with 486-based systems, some of which have not been optimized for the highest possible performance.

This includes cache, buffered disk controllers and even video boards that sport their own video coprocessors or at least accelerators.

Beware: Matching video boards to monitors is not easy. If you purchase a complete system, make sure these two components are matched to each other. Also, if you use Microsoft Corp.'s Windows, be sure the proper video drivers are included and loaded on the system.

Performance tests offer some means of comparing various systems. It is ideal to take the time to install your own suite of applications and run your own performance tests.

Failing the ability to do this, you should run the tests supplied by utilities vendors such as Symantec Corp., or run Intel Corp.'s newly released IComp performance tests.

had not been shipped with a floppy disk copy of the operating system, I would not have been able to get into the system to make the necessary file changes if I had not had a set of my own bootable disks.

In another vendor's system, installation of an internal fax/modem card crashed the system and destroyed the COMMAND.COM file on the hard disk. It was necessary to reload DOS and start over again. If we had not had a copy of DOS on a floppy, we would have been out of luck; no disks came with the machine.

The lesson you should learn from all of this is to be very careful in planning your purchase and choosing your vendors, particularly when you are looking at a volume discount. 486 prices have fallen to the point where you can truly score a bargain and still receive equipment that is high-quality and reliable.

The following steps will help keep you out of trouble when you make volume purchases.

## 1) Details, details.

Write a detailed set of specifications. Require that all systems come configured exactly as you need them, and make sure the specifications prohibit a vendor from making any changes to critical components such as the BIOS, floppy and hard drive controllers and serial and parallel ports.

## 2) Casting for extras.

If possible, purchase some "spare" systems. With 486 prices as low as they are (and falling), it is easy to tack a few more systems onto your order. Spare computers provide instant replacements for systems that are down, as well as spare parts.

It is also much easier to troubleshoot problems

**Ask for a bid sample system to configure and test your way.**

## 5) Remember service specs.

Determine ahead of the bid award exactly what service and support is included. Add a stipulation to the bid requiring the vendor to change out a system that is "dead on arrival" or that fails during the first few weeks of operation.

## 6) Matching samples.

Ask for a bid sample system, test it out, configure it exactly as it will be in your system and then insist that each and every machine delivered is *exactly* like the bid sample.

## 7) Price protection.

If you are purchasing a large number of systems

## 486 PC street prices

THE FOLLOWING ARE SELECTED STREET PRICES FOR SYSTEMS THAT CAN SERVE AS A GUIDELINE FOR GETTING THE BEST DEAL ON YOUR PC

## Top 3 overall (by price)

Vendor	Model	Chip/ Speed (MHz)	RAM (K bytes)	Hard disk (M bytes)	Extended cache (K bytes)	List price	Street price
Occidental	25-MHz 486SX	1486SX/25	4	170	—	\$1,595	\$1,346
ALR	Flyer 32DT 4SX/25	1486SX/25	4	170	—	\$1,749	\$1,500
Gateway 2000	25-MHz 486SX	1486SX/25	4	250	—	\$1,575	\$1,570
Compaq	SystemPro 486/33	1486DX/33	8	420	512	\$14,999	\$12,658
Zenith Data	Z-Server 450DE	1486DX/50	8	500	256	\$7,499	\$7,734
AST	Premium SE 4/50	1486DX/50	8	500	256	\$8,695	\$7,438

## Top systems by class (by price)

486SX/25	Model	RAM (K bytes)	Hard disk (M bytes)	Extended cache (K bytes)	List price	Street price
Occidental	25-MHz 486SX	4	170	—	\$1,595	\$1,346
IBM	PS/2 95XP OH9	8	160	—	\$7,475	\$5,962
Average					\$3,208	\$2,134

## 486DX/33

Compudyne	486DX/33	4	211	128	\$2,000	\$1,650
Compaq	SystemPro 486/33	8	420	512	\$14,999	\$12,658
Average					\$5,046	\$3,405

## 486DX/50

Compudyne	486DX/50	8	210	128	\$2,200	\$2,160
Zenith Data	Z-Server 450DE	8	500	256	\$7,499	\$7,734
Average					\$6,664	\$4,717

## 486DX2/50

Compudyne	486DX2/50	4	211	128	N/A	\$1,850
IBM	PS/2 90XP-OLF	8	400	—	\$7,415	\$5,887
Average					\$4,215	\$2,897

## 486DX2/66

DEC	DECPC 466D2LP	4	120	128	\$2,199	\$2,199
Dell	486SE	8	230	128	\$4,999	\$4,900
Average					N/A	\$3,237

**KEY:**  Least expensive  Most expensive  Average

Source: International Data Corp. PC Pricing Report (September 1992)

## Bring your own

One troublesome practice many 486 vendors are following is providing all the software on the hard disk but not shipping floppies. This can be a problem if you have to reboot the system. In an extreme case, incompatibilities can crash the system and destroy key files, or the system may become frozen during operation. If the user doesn't have the system floppy disks handy to start from scratch, he might be out of luck.

for delivery over a long period of time (six months to a year), insist on price protection. In other words, if the company reduces the list price by 5% during the delivery cycle, make sure you will get a price adjustment, at least on the systems you have not yet received. If you are a really good negotiator and if the order is large enough, you may even be able to obtain a rebate on the systems already in place.

## 8) Money talks.

Offer payment terms that will motivate the vendor. Even the largest vendors are concerned about cash flow. Suggest payment terms that provide a portion of the payment very shortly after delivery but hold back a final portion of the invoice until acceptance of all of the units and verification that all of the specs have been met.

Ask for a discount for net 10 days if your company can turn an invoice around. You may find that you will get an additional 1% to 2% discount by paying for the systems quickly.

## 486 PCs

Counterpoint

## Who needs a 486 PC anyway?

By Stephen Rood

Today's 486 PC story is as follows: Prices are low, the marketing hype is high and

there are countless choices.

But do you and your users really need a 486 PC?

Well, it depends on many factors, but

more times than not, the answer is no.

The question to ask here is not "What is today's lowest price on a 486 PC?" but "Are we really in need of such technology

in all cases, regardless of how attractive prices may be?"

Before I become a target of much wrath, let me profess my total support for the 486 platform. It is a great processor, and there are very good PCs built around this chip. However, this technology is overkill for the great majority of end users.

We are led to want these newer machines through a very effective marketing program organized by firms such as Intel Corp., the PC manufacturers and the retail channel trade.

With a growing competitive base, Intel must keep innovating in chip design and marketing to maintain its market share and stock price.

It seems like only yesterday that Intel ads featured a spray-painted, crossed-out 286 logo. They made us want to forget the 286. Now Intel would like us to forget the 386 for the 486.

## Productivity unproven

Faster 486 machines don't necessarily translate into greater end-user productivity, and I have yet to see studies that go beyond laboratory benchmarks. If users need to boost hardware performance, maybe a simple memory upgrade, coprocessor addition, new hard disk or graphics card replacement is more appropriate.

Before you succumb to the sales pitches, take stock of which applications your users are really running on their PCs.

If they're dedicated Microsoft Corp. Windows users, yes, performance on a 486 will be more dramatic. If your users plan to run Microsoft Corp.'s 32-bit Windows NT, OS/2 2.0 or Unix, performance requirements suggest a 486 machine. Users of computer-aided design packages need the power of a 486 for its improved instructional set and processor caching. The same holds true for users of high-end graphics packages and statistical forecasting and modeling packages.

Finally, if you're designing a PC network comprising 10 or more workstation nodes, a 486 will perform more efficiently than a 386 machine as the server.

The point here is that users need to resist the temptation to purchase the latest in 486 technology just because "prices have never been lower."

The bottom line is that the 486 technology is a great investment and cost-justifiable when selected to address particular application needs. But Windows NT hasn't even been released yet. How soon will we see a lot of 32-bit applications software?

The new technology is great. Track it, and keep up with its developments. Just don't fall victim to the marketing programs.

## Hackers? Viruses? Toll Thieves? LAN/WAN Crash?

*Is your unit really prepared enough for 1993?*

Next March 10-12 (Wed thru Fri), 1993, you and your associates will have the opportunity to mix and match sessions among 5 tracks - 70 vendors - 90 speakers - 3 days

(Only \$975\* for your corporate/agency team of **FOUR REGISTRANTS!**)

6th International Computer Security & Virus Conference

- ✓ Identify Latest Threats to SNA, DEC, PC, MAC, X.25, OS2, ISDN, UNIX
- ✓ Tools & Techniques: Learn What Major Corp's & Agencies Are Doing
- ✓ Specific Countermeasures: From Labs, Other Co's, Commercial Vendors
- ✓ Case Studies of Toll Fraud, LAN Disaster, Hacker Intrusion, Natural Disaster
- ✓ 2 Full Tracks of Product Demonstrations, Shootouts, Evaluations & Ratings
- ✓ Network One-to-One with the Experts & Your Counterparts Elsewhere
- ✓ 2.0 CEU; Certificate of Completion; 870-page bound *Proceedings with All Papers*
- ✓ Breakfast & Beverage Breaks, Luncheon, Empire State Bldg Observatory Reception
- ✓ Entire Large Floor, Across from Penn Station & Madison Sq. Garden, Parking Avail.

[3 tracks of prelim pgm & session chairs:]

**CIO/SVP/Mgt TRACK      Technical & Research TRACK      Full-Day LAN/LAW**

3/10 Wednesday [\$40 courses are each free to first 10 registrants]:

9:00 Schiffreen, Skulason: Intro to Computer Sec & Viruses Banyan: Vines Security  
1:00 Staff: Telecom Mgmt Skulason: Virus Tech Course Novell: NetWare Security  
Dinner: "Why Don't They Nail/Jail 'Em All?" vs "Virus Factories & Free Speech"

3/11 Thursday:

9:00 Keynote Address: Seamless Security  
10:15 Telecom I: Toll Fraud IBM's Approach LAN HW/SW Defense  
Richard Lekon, NYU William Vance, IBM Padgett Peterson, Martin Marietta  
12:00 [Buffet and restaurant Luncheon Provided]  
1:00 Risk Assessmt Panel MAC Attacks I Disinfecting LAN Server  
Stuart Katzke & Irene Gilbert, NIST Jane Paradise, Apple Harold Highland, CompuNet  
2:30 Encryption, RSA, OSI UNIX Security I LAN Policy and Disaster  
William Murray, Deloitte Tom Duff, Bell Labs Kenneth van Wyk, CERT/CMU  
4:00 Transborders: EC, Law What's Wrong With AntiVirus Products and Testing?  
Eiji Okamoto, JAIST Greg Drusow, Fridrik Skulason, Alan Solomon, Peter Tippert  
6:00 Empire State Building Observatory MEET THE EXPERTS Sit-Down Reception

ISSA

CMA

Opick

Rotenberg

Solomon

Spafford

Stang

Thackeray

Tippert

van Wyk

T.Duff AT&T, UNIX I.Gibert NCSC, NIST W.Murray Deloitte Titan J.Paradise Apple Security D.Parker SRI The Man Behind Titan R.Riordan Michelangelo R.Schiffreen Royal Cracker F.Skulason F-PROT, Bulletin W.Vance IBM Security

3/12 Friday:  
9:00 Publicly Available Help Tekkies' In-Depth Session Intrusion Detect/Prevent  
Klaus Brunnstein, U. Hamburg Fred Cohen, ASP Don Parker, SRI  
11:00 MAC II & DEC Attacks UNIX Security II Computer Crime Law, FBI  
Eugene Spafford (s) Purdue Karl Levitt, U.C. Davis J.J. Bloombecker, (s)  
1:30 "ET TU, HACKER?" THE GREAT DEBATE: 9 experts, sometimes heated views  
including Robert Schiffreen, who cracked U.K. Queen's Husband's E-Mailbox & tells how to stop him  
3:15 WAN/Warfare/Telecom II New Research and Ideas Recent CompCrime Cases  
Guillermo Mallen-Fullerton, Mex. Fridrik Skulason, F-PROT Gail Thackeray, Maricopa  
4:45 Continuation of Security Product "Shoot-Outs"

**Free Exhibits** for corporate/agency buyers [others \$30]: Fax your card & magazine name to (303) 825-9151  
[Your state-of-the-art 90 speakers are center photos plus competition winners incl several of prior authors/speakers e.g. shown at sides]

\*for 24 Hour, 7 Day Registration Assistance:

**(800) 835-2246 x190**

**6TH INTERNATIONAL COMPUTER SECURITY & VIRUS CONFERENCE & EXPOSITION**

Sponsors:  
In coop. w.



DPMA Fin. Ind. Ch. © 1992 - Data Processing Mgt. Association  
IEEE Computer Soc. - Inst. of Electronic & Electrical Engineers  
ACM-SIGSAC - Association for Computing Machinery  
CMA - Communications Managers Association  
COS - Corporation for Open Systems  
BCS - Boston Computer Society  
EDPAA Phila. Ch. - EDP Auditors Association  
NUI New York LAN Association - NetWare Users International  
ISSA New York Ch. - Information Systems Security Association



Rood is president of Ossining, N.Y.-based Rood & Associates, Inc., an IS consulting firm. Previously, he was manager of information technology at Coopers & Lybrand.

# HERE'S HOW OUR TOKEN RING PRODUCTS STACK UP TO THE COMPETITION'S.

Stack us up to any other major hub vendor, and see for yourself. Cabletron offers more Token Ring modules for the intelligent hub than the competition. Period.

But that's only the beginning.

Our Token Ring products are driven by Intel's high-performance i960 32-bit RISC processor. The competition's? 16 bits. Our active Token Ring modules provide up to 24 ports. The other guy's? Half that. And we have an integrated solution for bridging Ethernet, Token Ring and Wide Area Networks with a single module. Their solution? A stand-alone box.

Our products use Flash EEPROM for easy upgradeability. Theirs don't. Our Desktop Network Interface Cards support both STP and UTP and provide *at-a-glance* diagnostics. Theirs won't. And we've integrated twelve station ports on a single,

manageable repeater module with Ring-In/Ring-Out capabilities for both fiber and copper. They can't.

With 19 modules for our MMAC hub, Cabletron's Token Ring solution is "the complete solution." Theirs? Well, they simply don't stack up.

For more information on Cabletron's Complete Token Ring Solution, give us a call at (603) 332-9400, Ext. 2705. And ask for your free copy of Cabletron's *SNA and Token Ring Integration Strategy*, the white paper that maps out a smooth migration to the "new" SNA and integrated SNA/Token Ring environments.

*"To support new services to our subscribers, we at Blue Cross Blue Shield of Connecticut have embarked on an expansion project that will take us from 250 workstations to almost 2000! We found that Cabletron had the most complete line of Token Ring products and the technical support to assist us in designing and implementing the network that was right for us."*

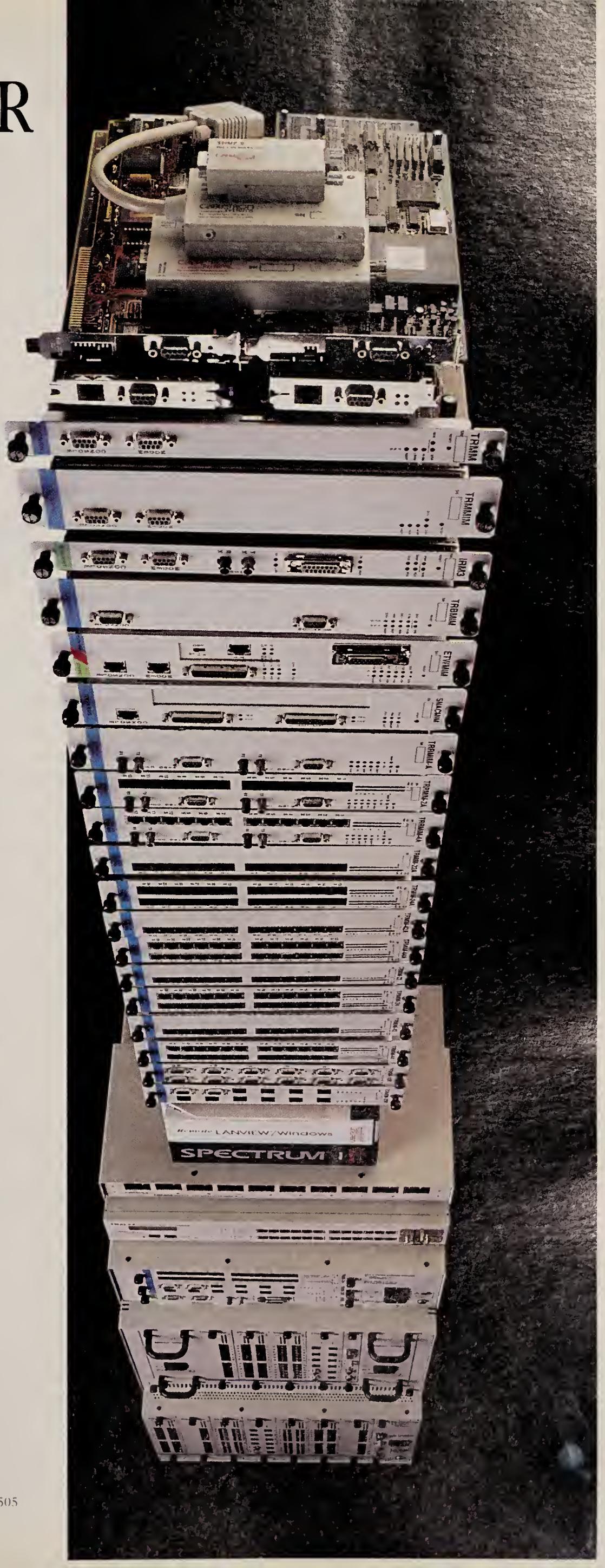


Graham Morrison  
Network Design & Engineering  
Blue Cross Blue Shield

**CABLETRON**  
systems<sup>inc.</sup>

Token Ring  
The Complete Networking Solution™

Corporate Headquarters 35 Industrial Way, P.O. Box 5005, Rochester, NH 03867-0505



# Voices of experience

By Robert M. Knight

■ Decisions about where and how to obtain the best buy in 486 PCs are based on the individual priorities and experiences of the purchaser. Here are a few examples of what's important to information systems buyers:

When Robert Selff decided it was time to replace his Intel Corp. 80386-based PCs a year ago, he knew exactly what he wanted in an i486 machine, and he knew exactly where to go to get it.

"I just said to the local reseller, 'This is the case I want, this is the system board, this is the power supply, the hard drive and the amount of memory I want,'" says Selff, an electronic data processing technical support specialist at the Cherry Textron subsidiary of Textron Corp. in Santa Ana, Calif.

"The system board is the major component of any PC," he says. "If you buy cheap, you have problems."

At Santa Ana reseller Micro City, Selff says, "they assemble it all for nothing, since there's nothing off the shelf like [his particular list of components]. Our 486 is half the cost of one from Compaq Computer Corp. or IBM — about the same as a clone, but I know what's in this one."

One reason why Selff is so picky, he explains, is because 486 PCs are fast becoming the company standard at Cherry Textron. They are key to a local-area network that provides computer-aided design (CAD) software from Autodesk, Inc. in Sausalito, Calif., as well as an in-house tooling management package for cost accounting.

The company is also attempting to gradually move payroll software off its IBM 4381 mainframe onto the network, according to Selff.

## Needs speed

For Bob Gallaway, the purchase decision comes more from a long process of "kicking tires and wheels."

According to Gallaway, manager of data processing at A&S Building Systems, Inc. in Caryville, Tenn., fast response time has made the 486 the standard for his company. A&S designs and

**Although for some customers, price is a big factor, it seems to mean nothing to a surprising number of them.**

engineers modular metal structures such as storage buildings, aircraft hangars, car dealerships and professional buildings.

The only exception, Gallaway says, is when someone needs a "stand-alone desktop operation where we can pick up a real cheap 386."

Even at that, Gallaway hasn't had to pay too much more for a 486. "I paid \$2,000 for a 33-MHz 386 about a year ago. Now I've got a 33-MHz 486 for about \$100 more. And I have clock-doubling capability that gives us 66 MHz," he says.

The 486 is at the heart of Black & Decker Corp.'s power tools and home products group in Towson, Md., as it attempts to bring about 30 sites across North America into a single network, according to Don Lee, vice president of information systems technologies for the group.

"Next, we want to network worldwide," Lee says.

Such a network brings with it several functions that he considers mission-critical, especially electronic mail, which supplies the operating numbers that are rolled into revenue and expense statistics used to measure monthly company performance.

"Because we have facilities worldwide, the fax capability of a 486 is important," Lee says.

In Towson, the Black & Decker group works with about 50 computers attached to a LAN housed in a three-building campus. But as the company expands the range of its networks, Lee says, he expects to negotiate agreements with its reseller, System Source in nearby Baltimore, which will include leasing as well as purchasing new 486 machines.

## Making a deal

**Old reliable**  
With reliability one of the top 2 most important criteria for selecting 486 PCs, users set the following minimum standards for the PCs they use:

(RESPONSE BASE: 150 USERS SURVEYED IN BUYERS' SCORECARD)

No. of crashes or failures per year	Percentage of respondents
0	44%
1-2	46%
3-5	7%
6-10	1%
Other	2%

Percentage of respondents who say the PCs they purchase meet their expectations for reliability	
Always	32%
Most of the time	66%
Never	1%
Other	1%

Purchasing the best 486 computer does not always encompass just price/performance, hardware, software and price/performance, according to Lee.

"You don't need to commit out front to large-volume purchases, but you do need to share your plans and intentions to set up a vendor relationship that allows for significant discounts," Lee says. "It's a very competitive environment, and you really should

compare several vendors and make sure that you've considered service, too."

Other users say they see relatively little difference in quality among the many systems competing for users' dollars. As a result, there are more viable channels to search for a good deal.

"We went through a reseller [Compass Computer Service in Falls Church, Va.] and got a markdown, but resellers aren't really necessary for us right now," reports Jeff Saper, network manager at Cadwalader Wickersham & Taft, a 300-lawyer New York firm that employs a total staff of about 700. "PCs are a commodity at this point, and you're just as well off going to Computerland or Gateway."

payroll, according to Saper.

"In a law firm environment, all applications integrate into one common product: money," Saper says.

Thomas Holdbrooks, computer service engineer at ABB Environment Systems, Inc. in Birmingham, Ala., says, "Price is not a factor. The major thing, because I come out of the user community, is speed, especially in CAD work because it's so computing-intensive. Granted, I'm not going to pay twice what it's worth, but...."

A critical factor for Holdbrooks, whose company supports a mixture of clones, is expansion space.

"We make sure we have enough card room to plug in accessories like a graphics cards, accelerator boards or a LAN board," he says.

Lewandowski agrees that PCs, even 486s, have become a commodity. He says it isn't unusual to find a 486SX in the \$1,000 price range.

## Don't want

For most 486 users, the features they get are the features they want. Some know what they don't want.

"I can do without the slimline case, and I don't care about having everything built in to the motherboard," Normand says.

"Initially, we will not exploit the channel architecture part of the 486," Lee says. "We don't feel we need some of the software that will run on a 486, such as the sophisticated scheduling that is part of the operating system."

Users of 486s seem divided on whether they would be willing to purchase the next-generation Pentium chip just introduced by Intel.

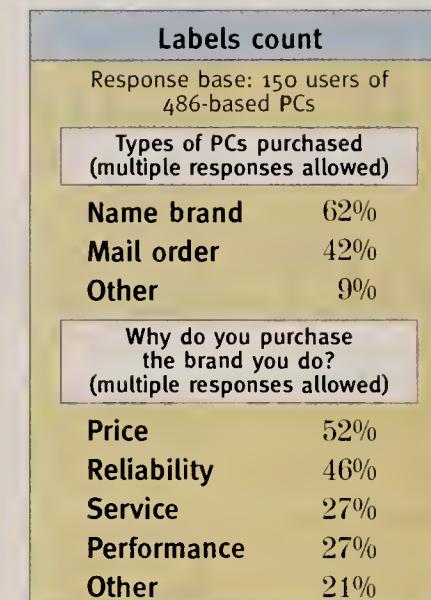
"I would go with the P5 because it will have more capabilities and horsepower than LANs are going to take," Saper reports. "It means that the 486 is going to become what the 286 was when the 486 was introduced."

Some agreed with Holdbrooks, who says, "I don't think we're ever satisfied, but the 486s we have right now are serving our purposes, and we're looking into a five-year life span for them."

Lee says he sees the life span of 486 PCs at Black & Decker being "18 months to two years."

At Cherry Textron, "we're not going to consider the P5 very soon," Selff says. "I like everything to be stable with a new technology first."

Alex Kohlbrock, senior engineer at Beldix Oceanies, says, "I don't want to fall behind because the revolution is happening so fast. But I think the 486 is going to last longer than other platforms."



Source: Buyers' Scorecard



## Impact on productivity shown actual size.

1 percent. That's the total increase in corporate productivity since 1980. By contrast, investment in information technology over the same period billowed to almost 50 percent of capital spending.

There is, however, some good news. With the help of Andersen Consulting, organizations of all types have been

able to turn these numbers around.

They're the ones who have chosen to view technology as but one element of an integrated enterprise. They're the ones whose strategy, people and processes have been synchronized with their new technology.

They're the ones who believe that

investment in technology is good. But return on investment is even better.

**ANDERSEN  
CONSULTING**  
ARTHUR ANDERSEN & CO., S.C.

NEW

# TOKEN-RING ELITE FROM SMC.

## B E Y O N D INTEROPERABILITY.

Introducing SMC EliteSeries™ Token-Ring adapters and MAUs.

More than just offering IBM Token-Ring interoperability, they also deliver a combination of advantages you've been seeking — industry-leading performance and SNMP Network Management at breakthrough prices!

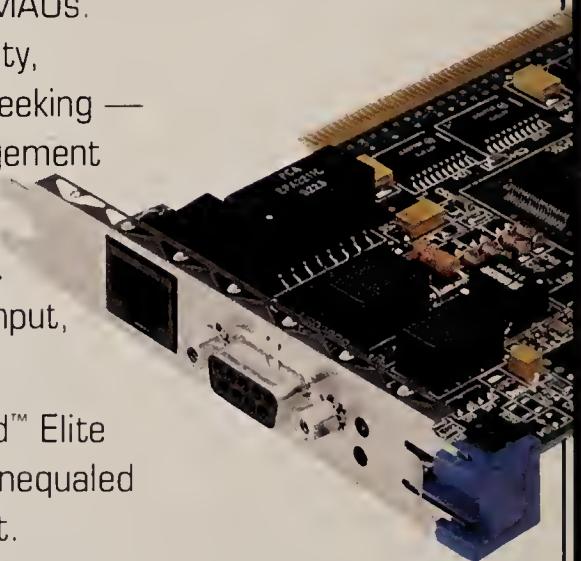
The secret is SMC's own dual-RISC controller chip. This next generation solution provides superior throughput, high reliability, and IEEE 802.5 compatibility, too.

You can choose from the complete line of SMC TokenCard™ Elite adapters and EliteSeries MAUs. All are backed by SMC's unequalled reputation for value, reliability and technical support.

FREE  
Evaluation Unit

Try any of these new products for a 90-day, no-obligation evaluation to see the advantages of going beyond interoperability. Simply contact your local reseller or SMC for eligibility details.

For a free Token-Ring Connectivity Brochure or help in ordering, call **1-800-SMC-4-YOU** (USA), **1-800-833-4-SMC** (Canada), **1-516-435-6255** (Elsewhere), or fax **1-516-273-1803**.



**SMC®**  
STANDARD MICROSYSTEMS CORPORATION

The Standard For LAN Performance

SMC is a registered trademark, and EliteSeries and TokenCard are trademarks of Standard Microsystems Corporation. All other registered trademarks and trademarks are the property of their respective holders.

©Copyright 1992 Standard Microsystems Corporation

# More Application Development!

51 Issues for \$~~48~~ NOW ONLY \$38.95

Yes, I want more. I accept your offer of \$38.95\* for 51 weekly issues.  
That's a savings of over \$9.00 off the basic subscription rate.

First Name \_\_\_\_\_ MI \_\_\_\_\_ Last Name \_\_\_\_\_

Title \_\_\_\_\_ Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Address Shown:  Home  Business  New  Renew Basic Rate: \$48 per year

\*U.S. Only. Canada \$74.97, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information below to qualify for this special rate.

1. BUSINESS/INDUSTRY (Circle one)

- 10. Manufacturer (other than computer)
- 20. Finance/Insurance/Real Estate
- 30. Medicine/Law/Education
- 40. Wholesale/Retail/Trade
- 50. Business Service (except DP)
- 60. Government - State/Federal/Local
- 65. Communications Systems/Public Utilities/Transportation
- 70. Mining/Construction/Petroleum/Refining/Agric.
- 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90. Computer/Peripheral Dealer/Distr./Retailer
- 95. Other \_\_\_\_\_

(Please specify)

2. TITLE/FUNCTION (Circle one)

- IS/MIS/DP MANAGEMENT
- 19. Chief Information Officer/Vice President/Asst. VP IS/ MIS/DP Management
  - 21. Dir./Mgr. MIS Services, Information Center
  - 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; LAN Mgr., PC Mgr.
  - 23. Dir./Mgr. Sys. Development, Sys. Architecture
  - 31. Programming Management, Software Developers
  - 41. Engineering, Scientific, R&D, Tech. Mgt.
  - 60. Sys. Integrators/ VARs/Consulting Mgt.
- CORPORATE MANAGEMENT
- 11. President, Owner/Partner, General Mgr.
  - 12. Vice President, Asst. VP
  - 13. Treasurer, Controller, Financial Officer



DEPARTMENTAL MANAGEMENT

- 51. Sales & Mktg. Management
- 70. Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT

- 80. Educator, Journalists, Librarians, Students
- 90. Other Titled Personnel

3. Does your job function require involvement with your company's or your client's computer/information systems/data processing/communications systems?  
(Please check only one)

YES  NO

E4246B-3

# More Enterprise Networking!

51 Issues for \$~~48~~ NOW ONLY \$38.95

Yes, I want more. I accept your offer of \$38.95\* for 51 weekly issues.

That's a savings of over \$9.00 off the basic subscription rate.

First Name \_\_\_\_\_ MI \_\_\_\_\_ Last Name \_\_\_\_\_

Title \_\_\_\_\_ Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Address Shown:  Home  Business  New  Renew Basic Rate: \$48 per year

\*U.S. Only. Canada \$74.97, Central/South America \$130, Europe \$195, all other countries \$295. Foreign orders must be prepaid in U.S. dollars.

Please complete the information below to qualify for this special rate.

1. BUSINESS/INDUSTRY (Circle one)

- 10. Manufacturer (other than computer)
- 20. Finance/Insurance/Real Estate
- 30. Medicine/Law/Education
- 40. Wholesale/Retail/Trade
- 50. Business Service (except DP)
- 60. Government - State/Federal/Local
- 65. Communications Systems/Public Utilities/Transportation
- 70. Mining/Construction/Petroleum/Refining/Agric.
- 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90. Computer/Peripheral Dealer/Distr./Retailer
- 95. Other \_\_\_\_\_

(Please specify)

2. TITLE/FUNCTION (Circle one)

- IS/MIS/DP MANAGEMENT
- 19. Chief Information Officer/Vice President/Asst. VP IS/ MIS/DP Management
  - 21. Dir./Mgr. MIS Services, Information Center
  - 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; LAN Mgr., PC Mgr.
  - 23. Dir./Mgr. Sys. Development, Sys. Architecture
  - 31. Programming Management, Software Developers
  - 41. Engineering, Scientific, R&D, Tech. Mgt.
  - 60. Sys. Integrators/ VARs/Consulting Mgt.
- CORPORATE MANAGEMENT
- 11. President, Owner/Partner, General Mgr.
  - 12. Vice President, Asst. VP
  - 13. Treasurer, Controller, Financial Officer



DEPARTMENTAL MANAGEMENT

- 51. Sales & Mktg. Management
- 70. Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT

- 80. Educator, Journalists, Librarians, Students
- 90. Other Titled Personnel

3. Does your job function require involvement with your company's or your client's computer/information systems/data processing/communications systems?  
(Please check only one)

YES  NO

E4246B-3



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



**BUSINESS REPLY MAIL**

FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTERWORLD**



P.O. Box 2044  
Marion, Ohio 43306-2144



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

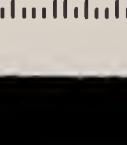
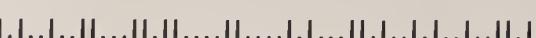
FIRST CLASS MAIL PERMIT NO. 55 MARION, OH 43306

POSTAGE WILL BE PAID BY ADDRESSEE

**COMPUTERWORLD**



P.O. Box 2044  
Marion, Ohio 43306-2144



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

# The SCOOP on client/server costs

*Yes, you'll save, but only if you know what costs to expect*

By Lynn Berg

When most people think about client/server cost savings, they envision the extreme dramatic stories about companies tossing out their mainframes, replacing them with local-area networks and saving millions.

True, moving applications off mainframes and onto smaller systems could save you as much as 50% in hardware costs. What is also true is that hardware savings are sometimes offset by certain overlooked costs — mainly those associated with setting up and then running a client/server environment.

Smart information systems chiefs plan for those costs, take advantage of simple cost-cutting measures and implement client/server technology in areas that will provide the highest re-

turn on investment. In this way, they're sure to take advantage of realistic cost savings.

## Unexpected costs

The list of companies moving to client/server is growing (see story below). However, while many organizations are proponents of the technology, they acknowledge that the savings they expected haven't materialized. That's because unexpected costs tend to eat away at savings. Watch out for the following savings busters:

- **Training costs.** When client/server computing is fully implemented, the mix of skills required in the average IS department will change. Existing staff will have to be retrained or replaced.

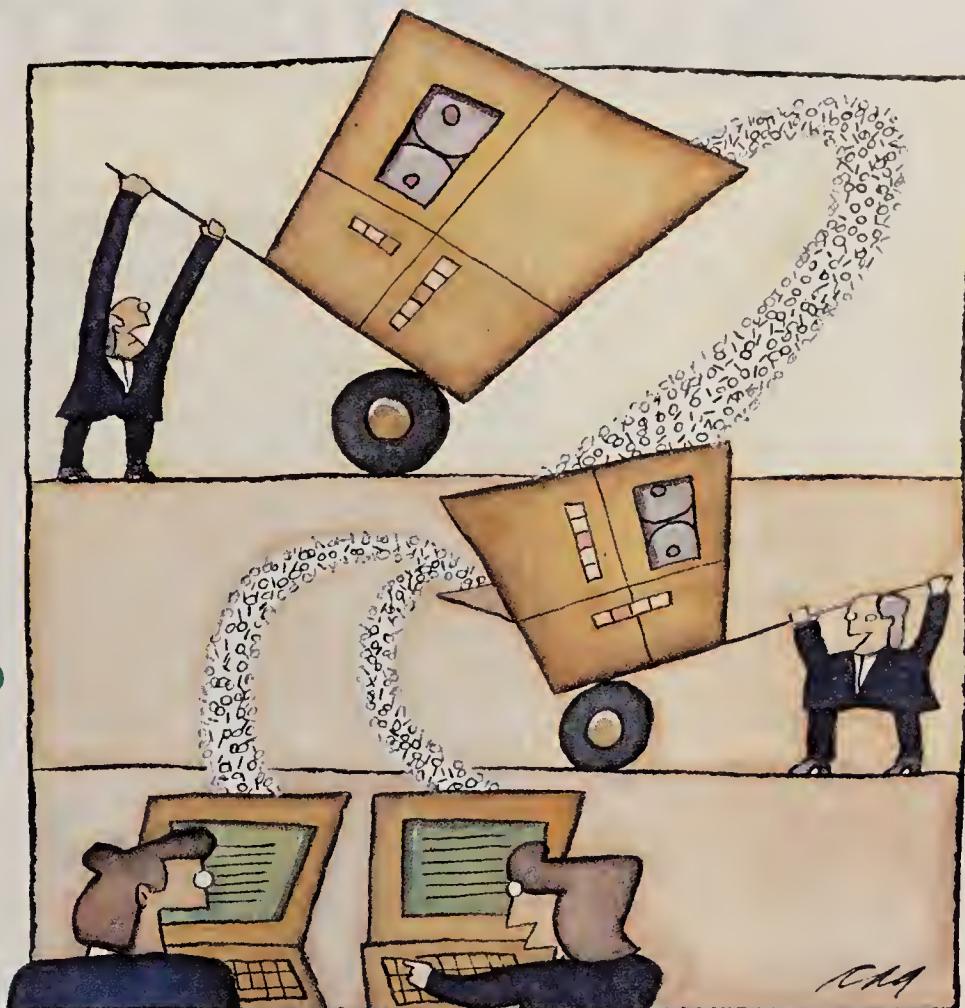
IS staff in the past were responsible only for a central system —its applications, file backup,

performance problems and systems tuning. Staff in a client/server environment must also take care of those tasks but on dispersed systems. Depending on where a bottleneck occurs, for instance, they'll need to deal with the system, the network or some strange, far-flung hub.

Whether training occurs on the job or in the classroom, plan on spending some bucks to bring staff up to speed on PCs, LANs, PC applications, network and systems management, application development, prototyping and support for end-user applications.

Former big-system staffers will need to learn how to handle software asset management, configuration management, performance analysis, archiving, backup and other management activities in network-based configurations. Mainte-

Costs, page 172



# Client/server is worth it, but . . .

## Product selection can be a hang-up

### Case: United Airlines

Reduced costs, improved computing efficiency and better employee scheduling were United Airlines' goals in shifting the company's CPU-intensive crew scheduling application from an IBM 3090/600 mainframe to a client/server environment in early 1990. Eighteen months later — six months later than projected — the company reached its goals.

The project came in later than planned because the Chicago-based airline hadn't counted on the amount of time it would take to investigate the plethora of available client/server offerings and train mainframe programmers

in the new Unix-based system.

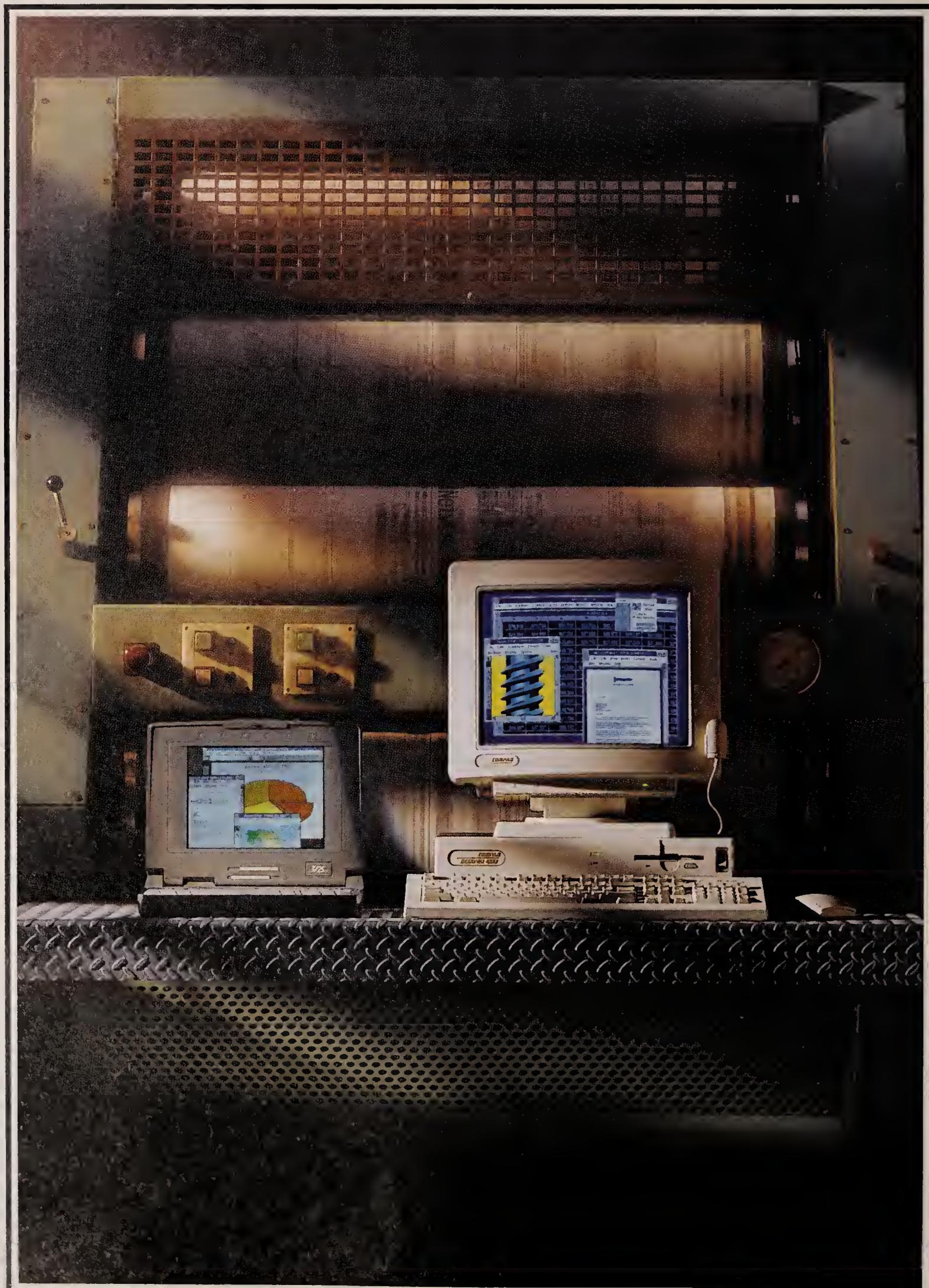
According to systems analyst Steve Greenfield, United's information systems team spent months talking with dozens of vendors, weeding out pure "sellers of hardware and software" from those willing to act as consultants and answer the company's questions about distributed architectures.

"Our decision was sometimes not made around the best hardware or its cost but whether a vendor could answer our questions. We wanted expertise because from a technical standpoint, we were breaking new ground," Greenfield says.

Ultimately, United purchased processors from Silicon Graphics, Inc. and Unix-based IBM RISC System/6000 workstations running SAS Institute, Inc. software for data entry, editing and file management.

Client/server, page 172

# WE SUBJECT OUR COMPUTERS AND VIBRATION. THEN WE PUT



Compaq Computer Corporation. All Rights Reserved. COMPAQ, DESKPRO, 1000, Registered U.S. Patent and Trademark Office. Prolinea, Contura, and ProSignia are trademarks of Compaq Computer Corporation. Product names and/or numbers may be trademarks and/or registered trademarks of their respective companies. The Intel Inside logo is a trademark of Intel Corporation.

# TO EXTREME HEAT, HUMIDITY FIRE THEM THROUGH THE PRESS.

At Compaq, we put our products through some of the most brutal testing in the industry. That way we can be sure they'll withstand the toughest test of all: public opinion.

“Compaq hit the mark with 14 machines that combined low price with high performance and a most-wanted list of features.”

*—InfoWorld, June 22, 1992*



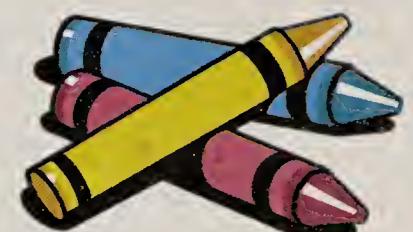
Our alliance with Intel enables us to improve on processor technologies with such advances as easy-to-upgrade architectures and sophisticated power-conservation features.

“...Compaq has slashed prices without compromising quality.”

*—PC Week, June 22, 1992*

“Compaq Computer Corporation has taken an aggressive pricing stance with its new ProSignia server line.”

*—PC Week, October 5, 1992*



Compaq engineers have already been improving our new affordable PCs. In fact, the COMPAQ Contura PC is now available with a super crisp, passive-matrix VGA color screen.

“Despite its low price, the ProSignia packs a variety of features.”

*—PC Week, October 5, 1992*

“...For running Windows on the road, the Compaq LTE Lite/25c is clearly the best notebook yet.”

*—PC Laptop, October 1992*

“It is the best-looking color screen on any notebook, plain and simple.”

*—PC Computing, August 1992*

“DeskPro/i...combines the traditional Compaq virtues of strong performance and technical innovation with aggressive pricing.”

*—PC Week, June 22, 1992*

“Make no mistake about it: this is a strikingly energetic Compaq.”

*—PC Week, June 22, 1992*

“You'd expect technical leadership from Compaq, but the Lite/25c's aggressive price took us completely by surprise.”

*—PC Computing, August 1992*



“Low-cost ProLinea offers solid quality.”

*—InfoWorld, October 5, 1992*

“...Compaq Contura 3/25 notebook is part of Compaq's clone-beater strategy and packs an aggressive price/performance punch...”

*—PC Magazine, August 1992*

“That's leadership.”

*—PC Week, June 22, 1992*

Continued from page 169

nance programming staff will need to shift gears because end users will be modifying their own programs

## Off balance

AS HARDWARE GETS SMALLER AND MORE CONNECTED, IS LABOR COSTS INCREASE

### Percent of IS budget

	LABOR	EQUIPMENT
Mainframe	55%	45%
Minicomputer	60%	40%
PC (stand-alone)	83%	17%
PC (terminal)	72%	28%
PC (LAN workgroup)	69%	31%
PC (enterprise network)	61%	39%

Source: Gartner Group, Inc.

and generating their own reports, databases and even applications.

The 75% to 90% of programmers' time spent on maintenance will decrease, freeing them up for new client/server development, including setting up interim files for end users.

Everyone in IS must buy into this new thinking. Only then does it make sense for staffers to learn and apply skills in C++, fourth-generation languages and relational database access methods.

### Labor costs associated with

ers. They may also work at staging views of databases to help users do their own maintenance.

It is not enough, however, to hand programmers new PC-based development tools. What's needed is a change of development philosophy at the highest levels in the IS organization. The application development life cycle model, in which the design is planned to handle every possible eventuality, must give way to a systems design that is flexible and reusable. Systems can debut in months.

## Tell it like it is

Here's a definition of client/server, courtesy of the IS folks at Levi Strauss & Co.:

The client/server model divides applications into functions and data that need to be shared by many users—the "server" part—and those that are particular to each user—the "client" part. Clients perform front-end functions (managing the user interface, collecting input data, formatting database query and report requests). Servers perform back-end functions (managing shared peripherals, controlling access to shared databases).

**system and network management.** While technology costs might decrease in client/server environments (PC millions of instructions per second are less expensive, and hardware can be written off over time), these savings tend to be offset by the high cost of additional labor (see chart at left).

One area in which this is particularly apparent is in system and network management. Vendors haven't yet provided tools for comprehensive, centralized management of distributed, heterogeneous systems. Until this becomes available (time frame: three to five years), you'll need people to deal with software coordination, troubleshooting, help desk calls and configuration management at every remote installation.

Some IS departments think a way to curb labor costs is to manage the backbone while abdicating remote LAN and system management responsibility to end users. This may not be a good strategy in the long

run. When centralized management finally becomes possible, it may be difficult to regain control and consolidate sites. Labor costs may rise as IS tries to bring management under its domain.

• **Telecommunications costs.** Enabling users to get at information anywhere on the network, no matter where the user is, is the powerful appeal of client/server computing.

However, as network access to systems becomes more common and access methods become more portable, network use costs become more difficult to predict. Users will be peers on the network, no matter where they are.

I recently spoke to a telecom manager at a large company who discovered that an application involving laptops in the service department could increase the cost of public network use by a factor of four.

• **Capacity planning costs.** Most mainframe or minicomputer systems today have tools and guidelines to help figure out the initial

Continued from page 169

Moving the scheduling system to a distributed architecture enabled United to avoid a mainframe upgrade that, computer systems engineer Jim Schneider says, would have cost between \$3.5 million and \$4.5 million. The new architecture has also more than doubled the CPU time available to schedule analysts for testing and to set up monthly schedules for the carrier's 8,000 pilots and 17,000 flight attendants.

"The more CPU time the scheduling application gets, the better the results," Greenfield explains, "and the better the results, the less scheduling costs." Overall, Schneider says, United expects to save about \$1.5 million annually as a result of the improved scheduling.

While client/server is hitting its stride at United, Greenfield cautions other managers against underestimating the amount of retraining a move to client/server computing involves. Inadequate training materials is one of the culprits. "There's no manual that says, 'If this is how you did something in the mainframe world, this is how to do it in a client/server environment,'" he says.

Mainframe programmers must learn and become proficient in capacity planning management and security techniques. They must also learn to work in a networked environment.

"What a commitment to client/server means is a commitment to training," Greenfield says. "The typical scenario of coding and then releasing a demo doesn't work in this environment. People need the opportunity to learn and to play with all of this."

Despite the challenges involved with client/server, Greenfield says he wouldn't turn back. "You take risks in exchange for the enormous potential for reduced costs and improved processing," he says.

## Expect to labor over integration

### Case: GTE Corp.

As recently as last year, customers who called GTE Corp. to place an order or request repairs had only a slim chance of receiving assistance without being transferred one or more times to a different department or service representative.

That was not a good record for a company that

wanted to increase sales. To improve service, GTE felt it had to create a single point of customer contact.

To that end, GTE decided to rip out its 20-year-old "user-ugly" mainframe-based order entry system and move to a client/server computing architecture, says Carl Schulz, vice president of Unix distributed computing at GTE Data Services, the company's IS subsidiary in Tampa, Fla.



The project, which is in progress, will ultimately give service representatives universal access to ordering, service and repair data. In this way, customers can call a single number for assistance.

The first and most critical step in the \$15 million migration, which began in April 1991, has been building an infrastructure capable of supporting Unix-based client/server applications, Schulz says. This has involved, among other things, building a separate Transmission Control Protocol/Internet Protocol (TCP/IP) network and implementing network control and management structures; establishing overall client/server standards; developing experience in the Unix operating system; and training developers in the C and C++ programming languages.

"From the beginning, our emphasis has been on putting our time and energy into the infrastructure rather than into applications, which, by comparison, are easy," Schulz says.

In June 1992, 11 months after the project was launched, GTE completed infrastructure testing

and began replacing the desktop equipment of its 3,000 service representatives, swapping out 3,270 terminals for X Window System-equipped workstations from Hewlett-Packard Co. Clients are linked over the TCP/IP network to HP servers, which house all application code and logic, and the mainframe, which acts as both database and data manipulator.

By the middle of this month, Schulz says, the new client/server system will be fully operational. That date is two months later than the projected 21-month schedule. "I did not include enough time for modifying the mainframe system, which was a larger effort than anticipated," Schulz explains.

Another pitfall was underestimating the time and effort involved in integrating various client/server system components, including multiple databases and applications and a graphical user interface system, Schulz says.

"In the old days, IBM did it all for you, but now we're buying packages from various vendors with products developed to run on multiple hardware platforms. Many times it is up to us to find the incompatibilities," Schulz says.

Integrating packages in-house also requires additional memory and throughput capacity.

## Training can slow you down

### Case: Texaco, Inc.

Eighteen months ago, the challenge facing Texaco, Inc.'s Scientific Systems Management (SSM) Group was providing users with seamless access to multiple VAX and mainframe-based databases containing oil exploration and production data. Additionally, the company wanted to create a plug-and-play computing environment that allowed both new and existing applications to access data companywide.

Texaco solved part of its problem by building what Tom Peters, manager of SSM's data group in Houston, describes as a "virtual data server" that combines a Sybase, Inc. relational database running on a Unix-based Sun Microsystems, Inc. server with a series of gateways. These gateways were either developed in-house by SSM's 10-person development team or purchased.

The system replaces a proprietary database

## What to expect

Here are the problems five companies encountered implementing client/server:

**United Airlines**' system was off schedule by six months because it took longer than expected to investigate products and train mainframe programmers in Unix.

**Quotable:** "People need the opportunity to learn and to play with all of this." — Jim Schneider, computer systems engineer.

**Harvard Community Health Plan** underestimated the magnitude of security issues. Workers' day-to-day tasks changed.

**Quotable:** "Client/server means a huge cultural commitment." — Donna DeAngelis, implementation director.

**GTE Corp.**'s effort to modify its mainframe system was greater than anticipated. Integrating client/server components, including databases, applications and GUIs, required much time and effort.

**Quotable:** "In the old days, IBM did it all for you, but now we're

systems purchase, monitor system use, partition work loads and help plan future purchases.

Unfortunately, these tools and capabilities don't exist in the client/server world. For instance, IS cannot perform systems monitoring effectively across networks of PCs. Work loads are typically set up for transaction throughput, not interactive file sharing or ad-hoc inquiry.

As a result, capacity planning is vague: You're never quite sure if you've bought too much or too little. Buying too much capacity is an expensive proposition, made more so because it may keep you from moving to the next wave of technology. It's tough to justify moving to something new when you've got more than enough system on hand.

Too little capacity hits the budget hard because in the long run you'll need a costly overhaul.

My advice is this: When considering a purchase, make your vendor run your applications to see if the system can handle what you've got.

## Making a move

Notable firms moving to client/server:

**Charles Schwab & Co.** Moving to distributed client/server architecture based on Open Software Foundation protocols. Personnel costs reportedly may hit \$25 million.

**Simon & Schuster, Inc.** Replacing isolated finance, production, manufacturing systems with server-based systems supporting workstations.

**Mead Data Central, Inc.** Moving core applications (inventory, invoicing, order management) to a client/server platform.

**Scalability costs.** Vendors are developing many client/server applications and tools for the PC and PC LAN environment.

However, because these applications and networks were designed to handle the communications needs of small workgroups, they aren't always scalable to a larger and more demanding environment. The option, in many cases, is a costly change — either adding multiple servers or starting again with a minicomputer.

Starting with a robust server can minimize scalability costs and problems. While such a server can save you from conversion later on, be advised that you may sacrifice file-sharing performance.

## Cost-cutting measures

Just as companies may forget to factor costs such as training into the hardware, software and maintenance equation, they may also over-

look these cost-cutting measures:

**Maximizing end-user resources.** In most corporations today, users work with personal productivity tools such as spreadsheet and word processing software. Take advantage of users' familiarity with their environments and their ability to access new applications directly from their existing systems and applications. It'll save you money in the long run.

There are tools available that use a spreadsheet model to enable users to, say, generate a report or do a query. Staff won't need to write turnkey applications (think of what you'll save there), plus it will reduce training and equipment costs and give users a sense of ownership and accomplishment.

Studies have shown that users who control and format their own information and determine their own access requirements are at least 50% more productive and about 70% more satisfied with their systems.

**Taking advantage of flexible,**

reusable software development. The move to client/server computing is an opportunity to rethink the approach to developing new systems. In the past, companies had to use a comprehensive information flow and systems design to ensure that all elements of a major system were integrated. Coding these projects would take years, and maintenance would go on forever.

IS organizations today need to think of client/server system design in terms of flexibility, not detailed planning of every inch of the system. Such flexibility is enabled by standards (such as standard programming interfaces) and tools (such as emerging object-oriented tools) that let IS staffs integrate and change system elements easily. When all these elements come together, programmers will be able to generate code that is recognizable and reusable by every other programmer. Maintenance becomes easier.

Companies save because they **Cost-cutting, page 176**

buying packages from various vendors. Many times it is up to us to find the incompatibilities." — Carl Schulz, vice president, Unix distributed computing.

**Texaco, Inc.**'s training took 50% longer and cost 300% more than anticipated. Hardware and software vendors were inexperienced in end-user client/server setting. IS had to write database gateways and routines.

**Quotable:** "A commitment to client/server computing probably means a lot more than most people first think." — Tom Peters, data group manager, Scientific Systems Management Group.

**ITT Hartford Insurance Group** found no tools to predict performance and configuration capacity, nor any support tools for network management, security and version control.

**Quotable:** "It is not the safest of courses, and you must be willing to pay for the experience, but the rewards are there." — Raymond L. Howell, assistant vice president of information management, commercial markets segments.

system linked to a Digital Equipment Corp. VAX, which will be phased out during the course of the next year or so.

The project took 18 months to build and cost about \$1.5 million (\$1 million for labor and the rest for hardware and software).

Under the new client/server system, users access exploration and oil production data from Intel Corp. 80386-based PCs and Unix workstations using Sybase DBLib client software.

Initial applications, which took twice as long as initially projected to convert, were brought up in April and target geophysical tasks such as map generation and oil well analysis.

While using off-the-shelf database software eased the overall development and implementation process, SSM's migration to a client/server system wasn't entirely problem-free, Peters says. Like others before it, Texaco underestimated the time and cost involved in training both system programmers and end users. Training took 50% longer than expected and cost 300% more.

"Part of the problem is [Fortran] programmers' lack of expertise in the C programming language. Separating data from applications took time — about nine months — and programming in a Windows environment was difficult and required a lot of training," Peters says. "Also, using networks takes more expertise than the average user has. This necessitates making them seamless."

Another warning Peters offers is that neither hardware nor software providers can furnish all of the answers.

"We found that software vendors had a hard time visualizing a client/server environment in an end-user setting because they hadn't had the experience," Peters says. "We also had hoped that the software had come further than it has. Some things just aren't available in the Unix world," he adds.

Peters and his group ended up writing many of their own database gateways and routines.

"A commitment to client/server computing probably means a lot more than most people first think," Peters concludes. "The hardware is relatively inexpensive. But it is very easy to underestimate training and implementation costs in both time and dollars."

## Network performance management tools are missing

### Case: ITT Hartford Insurance Group

"Client/server computing is not the safest of courses, and you must be willing to pay for the experience, but the rewards are there," says Raymond L. Howell, assistant vice president of information management at ITT Hartford Insurance Group's commercial markets segment.

### Tell me what's important

TOP IS CHIEFS PEGGED CLIENT/SERVER SYSTEMS AS THEIR TOP PRIORITY FOR THE NEXT FIVE YEARS

	% OF RESPONDENTS
1. Client/server systems	27%
2. Open systems	18%
3. Computer-integrated manufacturing	10%
4. Notebook PCs Pen-based systems	6% 6% — tie
5. Wireless networks	4%

Base: 100 IS directors

Source: Computerworld Premier 100

While a true believer, Howell acknowledges the client/server puzzle is still missing a few pieces. "First, we haven't found anything really useful to predict performance or configuration capacity needs," he says. "Also missing are support tools for everything from network management and control to security and version control. All of these are in their early phases."

As for training and retraining requirements, "these are bigger issues than I'd like," Howell says.

Given these constraints, ITT Hartford has a multiyear phase-in of distributed computing at its 40 offices. The goal, Howell says, is to move computing power as close to the end user as possible via portable, open systems.

For now, only its Minneapolis office has been cut over to a new client/server system, which delivers office applications such as electronic mail

and group scheduling via NCR Corp.'s Cooperation software running on NCR 3000 servers and Intel-based PCs.

Insurance applications, migrated from a mainframe to SQL Corp. and Oracle Corp. relational databases, run on server platforms from both DEC and Sequent Computer Systems, Inc. Currently, the system is OS/2-based, with plans to move to Unix eventually, perhaps as early as the end of 1993. By that time, the company says, it expects to have rolled out the system to a dozen more offices.

The project has been in the works since November 1989. The longest leg thus far has been defining the business requirements the new architecture would meet, Howell says.

"For the most part, our offices are equipped with 3270 terminals connected to a humongous mainframe system," he explains.

"It took a long time to establish where we wanted to go, and it is only now that we are rewriting mainframe-based legacy systems function by function. Our strategy was to start with office automation products to get users comfortable with the new system," Howell adds.

Previously, office functions were delivered via what Howell describes as the proverbial "islands of technology," primarily local-area network-based and stand-alone PC office products. Now, users have access to word processing, spreadsheet and other office applications via the Cooperation-based system.

Between equipment purchases and software development, Howell estimates the overall cost of the migration will be in excess of \$100 million when it is completed in four to five years.

## Cultural changes will occur

### Case: Harvard Community Health Plan

January 1991 marked a new year and a new system for Harvard Community Health Plan, one of the nation's largest health maintenance organizations (HMO), with 500,000 members. It cut over its Burling, Mass., health center from an aging batch-oriented automated medical records system running on a DEC PDP platform client server

Harvard, page 176



Maryfran Johnson  
*Senior Editor Workstations*

Mark Halper  
*Senior Correspondent*

Jean Bozman  
*Senior West Coast Editor*

# RELENTLESS, DETERMINED, COM

Relentless in the pursuit of the latest breaking news in IS.

Determined to dig deeper and work harder to uncover the stories that matter most to you.

Committed to the highest standards of excellence and integrity in journalism.

Focused on bringing you the IS information you need to know, when you need to know it.

Driven to cover it all — PCs, workstations, mainframes, client/server computing, networking, communications, open systems, languages, and more.

These are the qualities that distinguish the editors, writers, designers, and production staff of *Computerworld*. And they are the reason *Computerworld* is the newspaper of IS.

Week in and week out, the people at *Computerworld* cover the world of IS in greater depth and breadth than any



Joanie M. Wexler  
*Senior Editor Networking*

Alan Alper  
*News Editor*

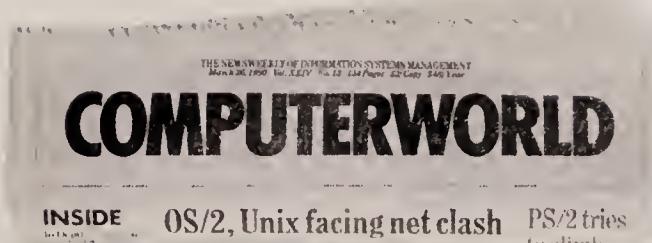
# COMMITTED, FOCUSED, AND DRIVEN.

other publication. That's why over 137,000 IS professionals pay to subscribe to *Computerworld*. Shouldn't you?

Subscribe to *Computerworld* today and you'll receive 51 issues packed with everything you need to know to do your job better. And get an edge on the competition. Plus, you'll get our special bonus publication, *The Premier 100*, an annual profile of the leading companies using information systems technology.

Order today by calling us toll-free at 1-800-343-6474. Or use the postage-paid subscription card bound into this issue. And get your own copy of *Computerworld*.

Then you'll see how a few relentless, determined, committed, focused, and driven people can make a difference.



The Newspaper of IS

Continued from page 173

don't have to reinvent the wheel with every system.

### High return-on-investment areas

When considering where to launch a client/server effort, keep in mind the following target applications. They have the advantage of increasing end-user satisfaction, providing a good training ground for new end-user and IS computing skills and starting the move toward a more integrated environment:

- **Decision support and information access.** I have often run across situations in which end users are rekeying data from reports into spreadsheets or local applications. This approach is slow, error-prone and wasteful. There are client/server products on the market that provide end users with access to one or more remote databases. These products not only let you cut out time-consuming steps but also give you

a good start at building a data network and helping you make better use of your existing investment in personal productivity tools and databases.

- **Interdepartmental document management.** Many companies have the need to reduce the paper shuffle. Creating, editing and routing documents is easy to automate, but it may be complicated when working across groups that have standardized on different editors and word processors, different systems, different mail routing and filing routines and different data types.

Check out products that let you convert formats, build compound documents and rationalize mail routing and filing.

These types of projects not only reduce wasteful overhead activity but also put you on the road to an integrated communications capability.

**As network access becomes more common, use costs are harder to predict.**

- **Interfaces.** Too often I see IS departments rewriting existing applications for the sole purpose of moving them to lower cost platforms.

Wholesale changes to applications may not be right in all cases. For applications that are working pretty well and have no urgent business reason to be rewritten or for applications that are just going through a simple platform conversion, consider merely putting a fresh face on them. You can develop easy-to-use front ends for those applications.

Front-ending existing systems with a jazzy screen will hone both developer and user skills in building and using graphical user interfaces and improve overall end-user satisfaction.

Deterred by immature technologies, blinding backlogs and the costs mentioned,

some IS departments are reticent about the move to client/server. The danger here is that things are not standing still.

Users are installing local computing solutions every day, often without regard to corporate standards or the need for integration. Without a corporate infrastructure actively in place, there is the potential for this ad-hoc approach to impede growth and competitiveness.

I'd recommend picking projects now that will keep everyone together. You want to focus on projects that are visible enough to get participation but not so critical that you can't handle mistakes. Properly implemented, these projects can be used to establish corporate standards, train staff, build partnerships with end users and evolve corporate guidelines for information access and use. •

Berg is a program director in midrange computing strategies at Gartner Group, Inc. in Stamford, Conn. She is the former group manager of the client/server program at Digital Equipment Corp. in Maynard, Mass.

Continued from page 173

system. That system is made up of Apple Computer, Inc. Macintosh desktops linked via an Ethernet LAN to a relational database from The ASK Group, Inc. running on a VAX server.

Harvard's clinical applications, including automated appointment scheduling, medical records and systems supporting the center's laboratory and pharmacy were the first to be migrated to the new system. Eventually, these will interface with a separate administrative system for membership and claims processing.

During the next three to four years, Harvard will also migrate its 20 other health centers to the client/server architecture, a

move driven by a need to more efficiently provide clinicians and others with current and accurate patient data and to cut costs.

Developed by San Francisco-based InterPractice Systems, a joint venture between Harvard and Electronic Data Systems Corp., the system took three years, or about 300 man-hours, to build, according to Scott Belmont, EDS' general manager at InterPractice.

Had InterPractice not underestimated the magnitude of security issues surrounding patient records as well as certain architectural design trade-offs, the process might have been somewhat shorter, Belmont adds.

"In designing the architecture, we fo-

cused on portability so that software could be migrated to other platforms and clients could be changed out without impacting the database or back-end business code," Belmont says. "But in doing so, we added [processing] overhead to the system, which affected performance. This is something we're now working on improving."

Training also turned out to be a sticky wicket for InterPractice's 100-person team. "There were pockets of expertise in advanced architectures and user interface design at EDS, and we were able to tap those resources, but the learning curve was still more than we anticipated," Belmont says.

At Harvard's Burlington center, where

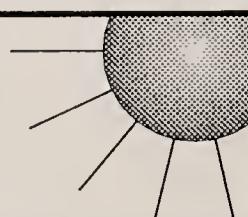
the system has now been in operation for more than a year and a half, implementation director Donna DeAngelis declined to comment on system costs, saying only that the system represents "a huge financial commitment."

It has also meant a huge "cultural commitment," DeAngelis says, noting that the system has changed the day-to-day tasks of many Harvard workers.

For example, there is no longer a need for data entry clerks to enter patient information, DeAngelis says. "The cultural change comes in moving operators to different jobs," she says.

Cases written by Julia King, a freelance writer based in Ridley Park, Pa.

### The sun never sets over CICS...



If CICS files block out your batch processing, consider the CICS Application File Control facility. CAFC's batch-to-CICS interface sends your scheduling system's requests for file and DLI data bases to your CICS regions. CAFC promptly closes, frees and confirms the actions so batch processing can begin.

Then to improve application integrity, CAFC enhances HSM support for your CICS regions. You gain full system managed storage without incurring allocation waits and staging delays. And, CAFC precisely manages each region's start-up. That is, every file, data base, data queue, shared data table, journal and transaction is precisely set to the proper status for warm, cold or emergency start-up. Your users will love CAFC's grouping function. It allows a single command to bring entire applications on and off-line.

Call today for more information or to arrange a trial. And if you are looking to upgrade to CAFC, ask about our liberal trade-up discounts.



NETEC International, Inc. • Telephone (214) 343-9744  
PO Box 180549 • Dallas, TX 75218 • Fax (214) 343-9009

**S**o your corporate climate is changing from proprietary to open...

...and you worry that during the migration your favorite mainframe tools may become extinct. We'll help you stay productive with familiar tools, while avoiding steep learning curves. Survival of the fittest applies to software, too.

**uni-SPF**™

The popular editor/user interface that includes Dialog Management Services.

**uni-REXX**®

The powerful system control language that makes ports for existing applications easy.

**uni-XEDIT**®

A familiar full-screen editor for novice and advanced users alike.

**the workstation group  
the business choice for open systems**

800-228-0255

**wrk/grp**  
the workstation group

# Computer Careers

Part 1 of a two-part series. This week, IS professionals talk about their work-related worries. Next week's article will provide insight into what is worrying managers.



You know you're stressed when...

✓ You're having trouble solving problems.  
✓ You're snapping at co-workers.  
✓ You have no energy left for your personal life.

## Trying times indeed for IS staffs

By Alice Bredin

You've just watched the display on your digital clock turn over another hour. You've been tossing and turning for hours now, and you just can't fall asleep no matter how many sheep you count. What's the problem here? It could be something you ate, but it's more likely you're just feeling the effects of today's stressful information systems environment.

Meeting tight deadlines, keeping up with technology, juggling varied tasks and solving complex technical problems are among the litany of responsibilities that IS professionals say have them gnawing at their cuticles and losing sleep.

"A project that used to have four people suddenly has three," says Stanley Stables, computer systems analyst at the administrative office of the Illinois Court in Springfield, Ill. "Suddenly, you've got 33% more work to do in the same time period."

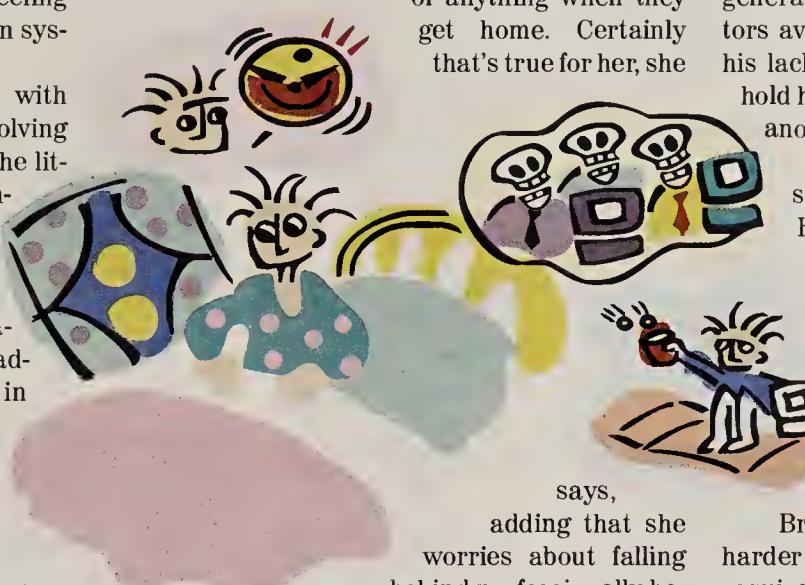
### No place like home

Debbie Bolk knows that feeling. A senior programmer analyst at Southwestern Public Service Co. in Amarillo, Texas, Bolk is starting to forget what home looks like. Cutbacks have almost halved Southwestern's IS staff during the past two years, she says, and when 16 people try to do the work of 30, days get very long.

Overtime is a given — on occasion, Bolk has had to put in a 24-hour stint. Overall, morale is

OK, she says, but when staff members work several long days in a row, they begin to get testy.

The company has tried to help by forcing all employees to take a lunch break and two 15-minute breaks every day. But the work environment is so intense that, according to Bolk, most staff members say they are too exhausted to do much of anything when they get home. Certainly that's true for her, she



says, adding that she worries about falling behind professionally because evenings and weekends are her only chance to catch up on research and reading. "It's hard to find time to read all of the magazines and newspapers that come across my desk, not to mention learning new software and platforms," she says.

Keeping up with technology is also a concern for IS professionals whose companies can't af-

ford to be on the cutting edge right now.

"I worry about the tools I have to work with," says Richard Holub, systems administrator at Burch, Inc., a commercial printer fulfillment and telemarketer in Benton Harbor, Mich. Holub says he could do a better job expediting projects and services for users if only he had SQL tools, fourth-generation languages and application generators available to him. He's also concerned that his lack of experience with these products will hold his career back if he decides to move on to another post.

Customers are also adding to the pressures on IS by demanding faster service. Holub says this pressure "bleeds into off-hours," when he finds himself worrying about whether or not he'll be able to meet deadlines.

Even routine technical duties can turn stressful in the current pressurized climate.

Greg Atwood, a systems analyst at Red Lion Inns and Hotels in Vancouver, British Columbia, says he's noticed that it is harder these days to sort through development requirements. Things are just a little too hectic for higher logic to function properly. "At work, you are doing so many things at once, it's difficult to solve some problems," Atwood says.

His solution: Take the problems with him. "The best time for me to solve these problems is when I get home and unwind."

Bredin is a free-lance writer based in New York.



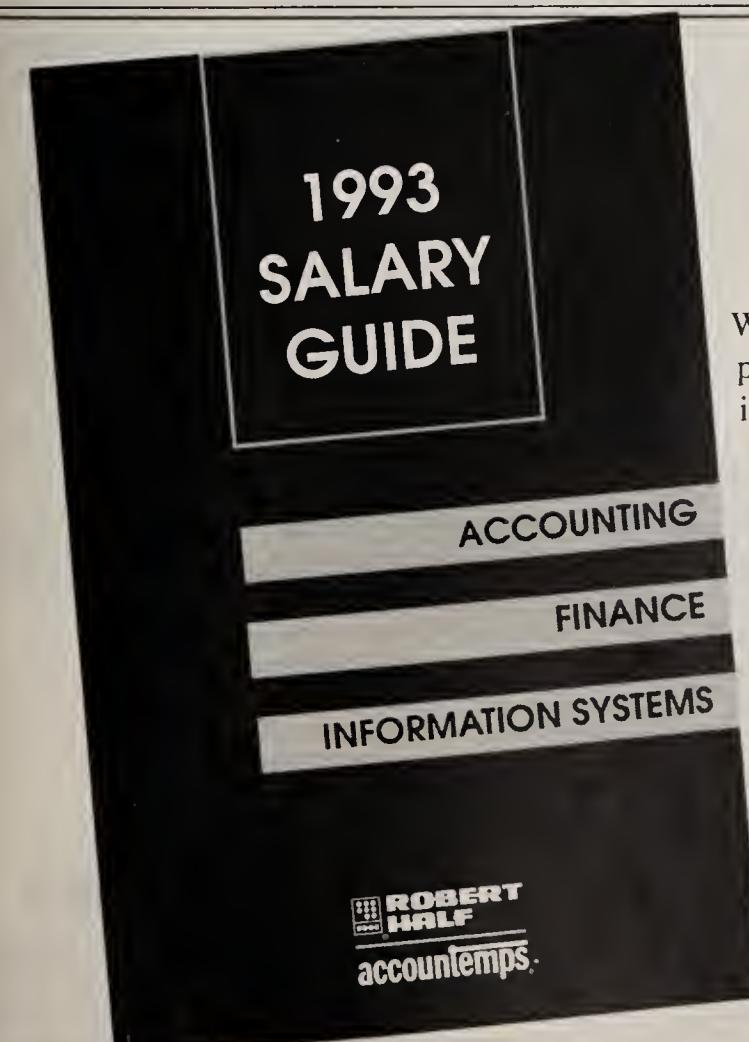
You can ease this stress if you...

✓ Put your concerns into words to determine the source of your worry.

✓ Remind yourself that you've handled difficult problems and situations before.

✓ Look around and realize that you're not the only one feeling this way.

Source: Linda Barbanel, a New York psychotherapist who helps professionals deal with work stress.



## INFORMATION HAS ITS REWARDS

When it comes to the overall picture of professional employment, salary data is important.

But as a manager, you also need to consider the pressing issues of benefits, training, turnover and managing costs through strategic staffing.

You'll appreciate the **1993 SALARY GUIDE** from the *Robert Half*® and *Accountemps*® organization that offers a comprehensive view of the nationwide current salary levels in Information Systems, Accounting, Finance and Banking key positions.

The Guide also includes useful information on benefits programs, trends in hiring and employee retention.

To obtain this **FREE** Salary Guide, call your local *Robert Half* office or call toll free today:

**In USA: 1-800-458-5700 Ext. 161**  
**In Canada: 1-800-463-4253**

**ROBERT HALF**  
Specialized Recruitment For The Information Systems Profession

©1992 Robert Half International Inc. An Equal Opportunity Employer.

# Computer Careers

## SOFTWARE DEVELOPMENT

**Triad Data Inc.**, a national software consulting firm specializing in leading edge development utilizing mainframe & client server technology, currently has staffing requirements in the following areas:

<b>MAINFRAME</b>	<b>CLIENT SERVER</b>
Adabas/Natural	C/C
Construct 3	Windows
DB2/SOL	Ingres
NAVIGATOR	sybase
AS1 Inventory	PowerBuilder
CBT Authoring Language	Gupta
TPF	Crosstalk
CASE TOOLS	

Please call or send resumes to:  
LIZ REARDON

**TRIAD DATA INC**

515 Madison Ave. - Suite 1710  
New York, NY 10022  
Tel: 1-800-966-8742 or 212-758-1010  
Fax: 212-832-7091  
Equal Opportunity Employer

**PROGRAMMER ANALYST (CONSULTANT)** - With minimal supervision, provide programming analysis services in project design, development and implementation of communications, financial management information, commercial systems and sophisticated text processing applications. Develop and implement systems interface including systems database and program design, coding and testing enhancements. Develop, write, code and implement new application programs to meet current and projected client needs. Duties entail work with C, UNIX\* Internals, Software Life Cycle Support, Interprocess Communications, PC to Mainframe Communication, Relational Database Management Systems and Shell Programming. Must have a Master's in Computer Science or Engineering, or Math or employer will accept a Bachelor's degree and two years' experience involving the use of C, UNIX Internals, Software Life Cycle Support, Interprocess Communications, PC to Mainframe Communication, Relational Database Management Systems, and Shell Programming. Experience required is six months in job offered or six months as a Systems Engineer. Additionally, experience must involve use of C, UNIX Internals, Software Life Cycle Support, Interprocess Communications, PC to Mainframe Communication, Relational Database Management Systems and Shell Programming. M-F; 40 hrs./week, 8:00-5:00; Salary \$35,600/year; Cary, NC location. Must have proof of legal authority to work in the US. All resumes must include Social Security Number, and J.O. #NC 722272 and DOT Code 030.162-014. Apply to nearest Job Service Office or send resume to Job Service, 700 Wade Ave., Box 27227, Raleigh, NC 27611. \*UNIX is a tm of AT&T. EOE.

This position is located in Pompano Beach, Florida. For consideration submit resume to Database Administration, P.O. Box 63-4846, Margate, FL 33065. EOE/M/F/V/H

**SENIOR HARDWARE ENGINEER** responsible for design analysis/validation, manufacture & support of MIPS architecture based RISC (Reduced Instruction Set Computers) Workstations. Provide technical expertise to resolve issues in manufacturing test & customer environments. Primary responsibilities include design verification & validation for workstations & Turbo-Channel option modules. Work on resolving hardware, firmware & software issues. Plan & implement projects to qualify various peripherals & software on MIPS RISC platforms. Liaison with Product Management & Manufacturing to analyze & resolve product configuration & production issues. Requirements for this position are a Master of Science in Electrical Engineering with a strong background in Digital & Analog Simulation & Timing Analysis, Microprocessors & Microprocessor Programming, & Engineering Management. Demonstrated knowledge of Concurrent Engineering & Electronic Computer Aided Design (ECAD). Knowledge of Printed Circuit board designs, ECAD tools for automatic design verification, placement & routing, Unix operating systems, Pascal programming languages & ECAD tools, is also required. Ability to interface with customers & manufacturing issues involving workstations. 40 hour work week; 8:15 a.m. to 5:00 p.m. Salary \$47,320.00. If you are interested in the above position, please forward two (2) resumes to Attention: Case #21270, P.O. Box 8968, Boston, MA 02114. No experience required. EOE.

**CONSULTANTS**  
NY/NJ/CT AREA:  

- Teradata
- IDMS COBOL
- DB2 CSP

**Southern Illinois:**  

- OS/2 EASEL

**Portland, Oregon:**  

- Unix System Admin
- Unix C++ OOD

**KMR Information Systems, Inc.**  
 377 Fifth Avenue, 4TH FL  
 New York, NY 10016  
**TEL:** (212) 779-3330  
**FAX:** (212) 779-3338

**CONSULTANTS SHOULD CONSULT MIMI**  
**Great Consulting Assignments and Full Time Opportunities**  
**Please send resume & call**  
**Mimi Simon Assoc.**  
 50 West St., Suite 1105, NYC 10006  
**(212) 406-1705**  
**FAX (212) 406-1768**

**Systems Analyst for Software Manufacturer**, 40 hour week, hours 9:00 a.m. to 5:30 p.m.; \$28,000 per year, M.Sc. Degree in Computer Science and 1 year experience in job offered or 1 year as Research Assistant. Will participate in the development, including design, implementation, testing and quality assurance for a multi-processing database engine product, database engine communications/portability. Will work with DOS, OS/2, SQL and Unix environments. Submit resume only to Job Service of Florida, 701 SW 27th Avenue, Room 15, Miami, Florida 33135. Re Job Order: #FL 071245. Employer paid ad

**VAX/ORACLE SOFTWARE ENGINEER** required. Programming and coding in VMS/VAX and ORACLE applications and specifically in the areas of order processing, invoicing and finished goods warehousing and distribution systems. Advise on system designing and implementation strategies. Design and develop complex applications and common routines/utilities using VMS/VAX, ORACLE, SOL, ORACLE RDBMS, Cobol, FMS (Forms Management System), Fortran and DMR methodology. Evaluate system performance and modify to improve. Masters Degree required in math, computers or engineering, plus at least 2 years experience in the job duties described above. Salary will be \$50,000.00 per year for a 40 hour work week. Interested applicants send resumes to 7310 Woodward Avenue, Room 415, Detroit, MI 48202. Reference No. 77792. Employer paid ad

**Programmer/Analyst** - 60% of time will be spent at client sites in Chicago, IL; 40% of time will be spent at client sites in Cincinnati, OH. Analyze, design, develop, implement, and maintain business applications. Provide technical support to end users. Utilize DB2, EASYTRIEVE, TSO/ISPF, MVS/XA, DL/1 on IBM mainframes B/S/Computer Science or Electrical Engineering. 2yrs/exp. in job offered. 35hrs/wk (9a.m. - 5 p.m.) \$40,000/yr. Must have proof of legal authority to work permanently in the U.S. Send resume in duplicate to: Illinois Dept. of Employment Security, 401 South State St. - 3 South, Chicago, IL 60605. Attn: Maxine Counts, Ref. # V-L-6264C. NO CALLS. AN EMPLOYER PAID AD.

## CONSULTANTS/FT

### Adabas/Nat

PARADOX ..... FOXPRO 2.0

LAN Spec ..... XCELNET &

SQL/Window develop w/DB2

CLIENT SERVER SUPPORT

SMALLTALK 80

STRATUS PL1 ..... ULTRIX

IMS DB/DC ..... DB2

COMMANDER/SYSTEM W

your solution is:

### SAGE SOLUTIONS

Ph 212-714-2599 FX 714-2558

875 6th Ave, #2305, NYC 10001

Where do  
the best  
computer  
professionals  
look for  
jobs?

Right here. In fact, more computer pros read more computer recruitment ads in *Computerworld* than in any other newspaper.

Talk to the best. Run your ad in *Computerworld*. For more information or to place your ad regionally or nationally, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

# How to place your recruitment ad in Computerworld

It's easy. All the information you need is right here. Just fill out the form and send it in. Or call Lisa McGrath at (800) 343-6474 (in MA, (508) 879-0700). (You can even fax the form to us at (508) 620-7739).

### Rates:

One Region - \$182.95 per column inch

East  Mid-West  West

Two Regions - \$228.69 per column inch

East/Midwest  Midwest/West  
 East/West

Nat'l Edition - \$251.57 per column inch

All closings for space, camera-ready materials, and telephoned copy for pub-set advertisements are 3 p.m. Thursday (all continental U.S. time zones) 2 working days prior to the Monday issue. Blind box charges are \$100 (U.S.) and \$200 (Foreign).

### Copy:

We'll typeset your ad at no extra charge. Please attach clean, typewritten copy. Figure about 25 words to a column inch, not including headlines. Minimum ad size is 2 column inches. Any special artwork should be enclosed with your ad also. Logos must be submitted on white bond paper for best reproduction.

Issue Date(s): \_\_\_\_\_  
(issued every Monday)

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_



Weekly.  
Regional.  
National.  
And it works.

**COMPUTERWORLD**  
**CLASSIFIED ADVERTISING**

Box 9171  
Framingham, MA 01701-9171

### Sunbelt Opportunities

CASE Tools Analysts 40-55K  
IBM PC/C Prog/Analysts 30-36K  
IMS DB/DC Prog/Analysts 30-37K  
MSA or M&D Analysts 35-49K  
IDMS ADS/O Prog/Analysts 30-39K  
ACPI/TPF Prog/Analysts 38-48K  
EDI Prog/Analysts 33-43K  
HOGAN Prog/Analysts 35-50K  
DB2/ICIS Prog/Analysts 33-40K  
AS/400 Prog/Analysts 30-39K  
TANDEM Prog/Analysts 33-44K

North Carolina's largest employment agency business since 1975. 300 full time employees. Report to the Southeast and nationwide. Fee paid.

CORPORATE PERSONNEL  
3705 320 Latitude Drive, Box 221799  
Charlotte, NC 28222 (704) 366-1800  
Attn: Rick Young, C.P.C.

## Job Close-up

# Database administrators: Super stress handlers

By Leslie Goff

If you're a glutton for work with a high tolerance for stress and an interest in avoiding the limelight, perhaps database administration is a career you should consider.

Database administrators are the unsung heroes of information systems, says Marilyn Cumberland, manager of the data administration/computer center at COMSAT Corp. in Washington, D.C. "We're sort of the engine that runs everything," she says. However, like most engines, they seldom get much attention until things go wrong.

What database administrators do is critical for the smooth operation of an enterprise. They manage the physical and logical aspects of the database and work with systems analysts to create tables and indexes that let users access data. They also maintain the tables, back up and recover the data, monitor direct-access storage device use, troubleshoot and help the systems staff fine-tune the operating system. They are the keepers of the data, says Dean Flannigan, database administrator at Quality Stores, Inc. in North Muskegon, Mich.

The demand for database administrators is good, as are job security and growth potential. Database

technology will likely continue to be an IS centerpiece, so those who can keep up with technology changes will always be able to find a job. Salaries are a plus as well, ranging from \$35,000 to \$65,000, depending on your location and experience.

"It could be a springboard into upper management because you tend to see the big picture and deal with so many other users," says Mike Ewanowski, database administrator at the Data Resource Management Group, Technical Services, at Emory University in Atlanta.

## Management potential

In a small shop, database administrators can become prime candidates for upper IS management. For instance, at the Pacific Maritime Association, an arm of the International Longshoreman's and Warehouseman's Union based in San Francisco, Jose Martinez leveraged his database experience to become assistant director of IS, with overall responsibility for applications development, systems software and the database.

"In a small organization, you tend to have people who are knowledgeable in a variety of areas," Martinez says. "You have to wear different hats, do different functions, as well as deal with end-user problems. The



## Database Administrators

**SALARY:** \$35,000 to \$65,000.

**EXPERIENCE:** Three to five years in programming, systems analysis. Database analysis is also usually a prerequisite of database administration.

**EDUCATION:** Bachelor's degree in computer science or IS. Business background a plus.

**SKILLS:** Knowledge of system software needed. Relational database experience on a mainframe or a PC is required. Problem-solving ability is also a plus.

path from applications programmer to database administration to getting into the operating systems was a natural opportunity."

Unfortunately, many of these activities are transparent to business users and managers. They see the applications but don't spend much time thinking about what will keep the database that feeds them in good repair.

But that could be changing, as DB2 shops implement joint application development techniques that bring database administrators directly into the applications development loop, along with systems analysts and end users.

## Pressure is high

Intense pressure on the job is the most common complaint among database administrators: keeping up with new technologies, solving problems as soon as they occur, serving as a jack-of-all-trades and being constantly on call.

Therein lies the job's appeal: It offers constant technical challenges as well as a bird's-eye view into the organization.

"You're always in on the big picture," Cumberland says. "There's always something new and always a different challenge. You have a new set of problems with every system you design, and you have to be able to anticipate them."

Most database administration managers say they are looking for a candidate with three to five years of experience in programming and systems analysis. A stint as a database analyst, a more task-oriented position, is usually a prerequisite for administration.

Knowledge of systems software is a plus, as is experience with a relational database on the mainframe or the PC.

David Wollenberg, technical support manager at Bloomington, Ill.-based Eureka Co., a vacuum cleaner

maker, says learning PC-based relational databases "could add a lot of years to your career."

Even though Eureka is a Unisys Corp. shop running a hierarchical database, Wollenberg looks for relational experience when hiring.

A bachelor's degree in computer science or IS is usually required, although Wollenberg says he doesn't believe one is necessary. "I'm looking for a tech-head," he says. "I'll ask a lot of technical questions."

Ewanowski says a business degree is also a good start because it provides background into business functions and how an organization is run, and Flannigan recommends "any kind of course or curriculum that focuses on problem-solving ability, from math to philosophy."

Goff is a free-lance writer in New York.

## WE'RE HOT

If you are self motivated with strong technical skills and are looking forward to working with a dynamic consulting company in sunny Phoenix, we want you on our team.

Immediate openings:  

- Banking (Proj. Leaders, Team Leaders, P/A's)
- IMS DB/DC, DB2 • IEF • CICS
- Easel/IMS • PC Express, Express MDB
- Software Engineers
- Software Test Engineers
- Documentation Specialists
- WALKER

Call or send resume to:

Laurie Zinker  
(602) 279-4498  
or fax (602) 279-1161  
4747 N. 7th St. Ste. 424  
Phoenix, AZ 85014

PROFESSIONAL SOFTWARE CONSULTANTS

**R S T**

RENAISSANCE SYSTEMS TECHNOLOGIES, INC.

*Data Processing and Engineering Opportunities*

3000 Town Ctr  
Suite 2237  
Southfield, MI  
48075  
(313) 353-0894  
Fax (313) 358-4499

If you have the desire to excel, have 2 years professional experience and are authorized to work in the U.S. on a full-time basis, consider opportunities in Michigan:

**ORACLE (Forms 3.0)**  
SAS/OS/JCL  
IMS DB/DC/DB2  
GUI/WINDOWS  
DB2/CICS  
OS2/DBM/Pres. Mgr.  
SUN/APOLLO Netwkg.  
SMALLTALK

We provide recognition for jobs well done through top pay & extensive company-paid benefits. Contact RST by phone, or fax / mail your resume to Dept CW.  
eoee

## PLEASE Let us help you find a better job!

KANSAS CITY and  
NATIONWIDE opportunities.

Immediate openings now for:

- IEF BSD or Construction (6 mos. experience)
- COBOL w/ CICS/DB2 or MANTIS/SUPRA
- OS2/Pres Mgr or DOS/WINDOWS development C/UNIX
- "Big 6" Healthcare Proj Mgt or Sys Analyst exp.
- HP3000 Speedware or Powerhouse
- ADABAS/COMPLETE
- EASEL
- LAN/WAN Networking
- AS400 SYNON

Send your resume in confidence to:

**ABSI**  
P.O. Box 26242  
Shawnee Mission,  
Kansas 66225-6242  
or  
fax (913) 894-0637  
call 1-800-775-6177  
"an agency you can trust"

## UNIX/C/C++ PROFESSIONALS

A leading Object-Oriented technology Co., has immediate openings in our advanced software R/D organization, seeking top college graduates who have Master or PhD degree in CS, CE, EE with strong background in UNIX/C/C++ Object-Oriented programming, distributed database management, X-Window, MS-Window, computer graphic and networking areas.

We offer excellent salary, benefits and career opportunities. For confidential consideration, please submit your resume to Recruiting Director, Youngtech, Inc., P.O. Box 1432, Summit, NJ 07901 or Fax 908-665-9622

**YOUNGTECH, INC.**  
THE OBJECT-ORIENTED TECHNOLOGY CO.

## ★ GET OUT ★ OF TOWN NATIONWIDE OPPORTUNITIES

YOUR HOME TOWN MAY HAVE MANY JOBS, BUT NOT YOUR CAREER OPPORTUNITY! THE COMPUTER-TECH NETWORK OF 60 NATIONAL COMPUTER SEARCH AGENCIES SPECIALIZED IN THE PLACEMENT AND PAID RELOCATION OF COMPUTER PERSONNEL TO ALL AREAS OF THE U.S.A.  
(216)-356-9990

FAX # (216)-356-9991

TOLL-FREE 1-800-752-3674

COMPUTER TECH NETWORK

21610 Center Ridge Rd.  
Rocky River, Ohio 44116

A call to COMSYS could lead to challenging opportunities on state-of-the-art projects for our Fortune 500 clients. If you are at the top of your field and thrive on mastering new technologies, you could become a part of our national network of computer consultants. COMSYS offers competitive salaries and full benefits. If you have the following skills, we'll help you put your future on line:

PATHWORKS  
IDEAL CICS  
ADABAS NAT  
LUO  
CICS 3.2 or 3.3  
BATCH COBOL JCL

C PARADOX  
ADABAS DBA  
VAX FORTRAN  
EASEL  
CIBORG  
DB2 DBA/DA

ORACLE 6.0  
COBOL VSAM  
MS WINDOWS  
SYBASE  
IEF CASE  
UNIX XWindows

UNIX GUI  
SAS IMS  
X400 SNADS  
WALKER SW  
PROKAPPA  
DB4 FOXPRO

**COMSYS**  
computer project support

Dept. CW 4 Research Place, Rockville, MD 20850

(301) 921-3600 • FAX (301) 921-3700 (fine)

**800-926-6797**

Atlanta • Colorado Springs • Dallas • Denver • Phoenix

Raleigh • Washington, DC

NACCB Member EEO M F H V

## CONSULTANTS

Immediate Interviews

- Powerbuilder
  - Natural 2
  - Sybase
- Sun Sys Adm
- APS/CICS
- Smalltalk 80
- SUN/UNIX
- IDMS/DB2
- SYNON
- Stratus/PL1
  - Motif
  - Teradata
  - Uniface
- CSP • M&D
- Firmware

John Rogers Computer Svcs  
1212 6th Ave., 9th Fl  
NYC 10036 Fax: 212 302 4363  
212 921 1319 / 800 338 5995

East

# Santa Fe Opportunities

FIRST HEALTH Services Corporation is a national leader in healthcare claims processing and on-line managed care. Ours is a strong record of success with an emphasis on providing key expertise to America's largest industry---healthcare. Today, our success continues to grow. Excellent career opportunities exist with us in Santa Fe, New Mexico.

## Systems Manager

Manage a staff of systems professionals and coordinate daily operations. We seek the proactive professional with 5 years of management experience. A degree in computer science or equivalent experience required.

## Sr. Programmer Analyst Programmer/Analyst

All positions require a degree in computer science or the equivalent, plus 2-5 years experience in programming/analysis. Essential are strong leadership, analytical and teaching skills. Ability must encompass COBOL • IBM OS, JCL • exposure to IBM Assembly and utilities • Access methods • CICS • ROSCOE or other editor • VSAM • report writers • systems programming/design techniques. Previous experience in healthcare claims processing desired.

We offer attractive salary and benefits. Additional opportunities also exist within our other locations. For details and immediate consideration, please send resume and salary history to Flo Beale, Section NMX, 4300 Cox Road, Glen Allen, VA 23060.



**FIRST HEALTH  
SERVICES CORPORATION**

EEO AA M/F We promote a drug free work place.

## UNIX SYSTEMS ADMINISTRATORS

Keane, Inc., a major developer, integrator and supplier of a full line of UNIX-based hospital software products, is seeking UNIX SYSTEMS ADMINISTRATORS. Candidates must have 2+ years UNIX systems administration experience with knowledge of AIX or Ultrix. In depth knowledge with UNIX kernel, systems configurations, installations and C language programming are required. Experience with TCP/IP, DecNet, networking, client server environment and 4GL's are a plus.

Keane offers competitive salaries and a great benefits plan that includes tuition reimbursement, 401(k) plan, vacation condominiums and more...

Send resume to: Greg Alleyne  
KEANE, INC.  
Healthcare Systems Division  
395 North Service Road, Ste 202  
Melville, NY 11747

An Equal Opportunity Employer

## APS

CCG has immediate permanent staff openings for Programmer Analysts with **APS** experience in an IBM 30xx environment. CCG employees receive a **FULL SALARY**, paid vacation, 401k, paid overtime and more!

### Computer Consulting Group

#### Contract Professional Services

4109 Wake Forest Rd  
Suite 307  
Raleigh, NC 27609  
1-800-222-1273  
FAX (803) 738-9123  
Member NACC

## ANALYST/ PROGRAMMERS

Perm/Contract - W. PA  
• AS400/SYS38, RPGIII/COBOL  
• SUPRA/MANTIS, TSO, CICS  
• VAX, COBOL, SQL, RDB  
• MEDIPAC/CLINIPAC  
• C, C++  
• TANDEM, NS, SQL  
• ORACLE  
• DATACOM, IDEAL  
• IMS DB/DC, DB2

### Gateway Resources Inc.

1050 Saxonburg Blvd.  
Glenshaw, PA 15116  
Fax: (412) 487-6989  
Phn: (412) 487-4660

## COMPUTER PROGRESS UNITED

\$40,000 to \$60,000

We provide Fortune 500 companies with consulting and programming services. We have immediate positions available for P/A in Kentucky, Ohio, Indiana, and Tennessee. We are the DB2 Specialist!

**TELON ■ APS**  
**DB2 ■ IMS ■ CICS**

Send resume or call:  
Computer Progress United  
12730 Townpark Way  
Louisville, KY 40243  
(502) 245-6533

Systems Analyst - Analyze users requirements, design, test and implement financial and banking systems utilizing COMS, DM3II, COBOL and LINC on UNISYS A series hardware. Define and establish database structures. Prepare program specifications and systems documentation. Enhance or debug existing systems and programs. 40 hrs./wk; \$43,000/year. Requires Bachelor deg. in Comp. Sci., Math or any Engineering field and 2 yrs. exp. Resumes to Orlando Job Svce Office, 3421 Lawton Road, Orlando, Florida 32803; Attn: Job Order #FL 0715152.

## THIS SPACE FOR HIRE

Call today  
to place your  
recruitment  
ad.

**800-343-6474**

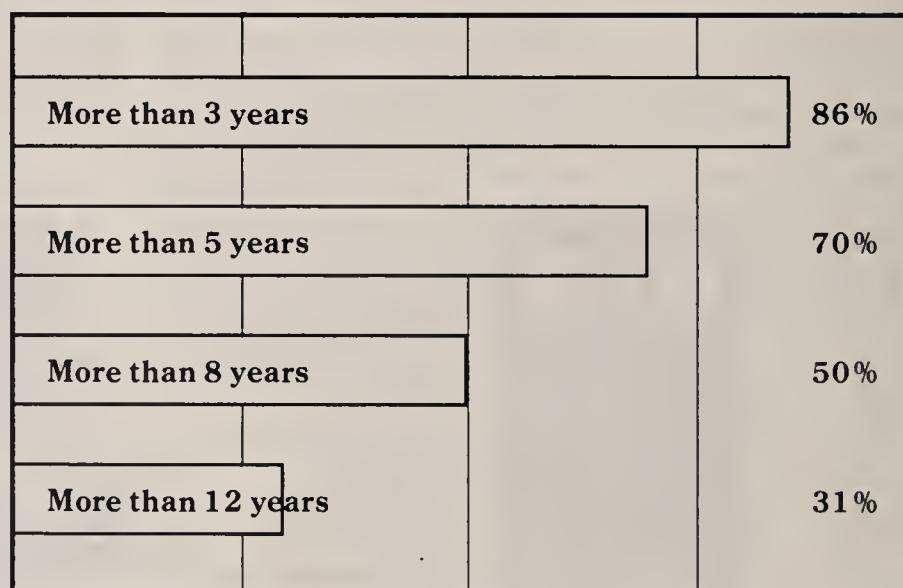
in MA, 508/879-0700

# ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld gives you only qualified computer professionals.

Unlike the readers of Sunday or daily newspapers, every Computerworld reader is an experienced computer professional. In fact, the majority of Computerworld's audience has experience beyond three years. What's more, some subscribers have been reading Computerworld ever since its first issue in 1967. Simply put, Computerworld delivers far more than just job candidates - it delivers qualified job candidates.

**Years in Current Job Function  
Reported by Computerworld's  
Audience of 629,204**



SOURCE: Skill Survey of Computerworld's Audience, June 1991.

To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, at **800/343-6474** (in MA, **508/879-0700**).

**COMPUTERWORLD**

Where the qualified candidates look. Every week.

## East

**ISF, INC.**  
Jacksonville, FL  
A Data Processing  
Consulting Company

**AS/400  
PROGRAMMER/ANALYST**

- 2+ years experience
- SYNON experience
- RPG experience
- B.A. or B.S.
- competitive salary

**S/36 PROGRAMMER**

- 2+ years experience
- RPG experience
- B.A. or B.S.
- competitive salary

Technically challenging work. Team approach to working environment and management. Very attractive benefits. Send resume to:

**ISF**  
9550 Regency Square Blvd.  
Suite 1240  
Jacksonville, FL 32225  
Fax (904) 723-3561

**Southeast**

Computer Consulting Group, has immediate openings on its southeast consulting staff for talented Programmer/Analysts. We're especially seeking:

- IMS or CICS or DB-2
- IMS APS
- DB-2 CSP
- IDMS/ADSO
- NATURAL/ADABAS
- GUPTA
- SQLWINDOWS
- DB-2 FORTRAN
- INGRES/VAX VMS

Computer Consulting Group

Contract Professional Services

4109 Wake Forest Rd  
Suite 307  
Raleigh, NC 27609  
1-800-222-1273  
FAX (803) 738-9123  
Member NACCB

**Why WTW?**

Because You're The Best. We're WTW, Information Technology Consultants. Exceptional opportunities exist in the southeast for bright application developers. If you are a senior programmer analyst and know...

**SYBASE**  
Call or send resume now  
P.O. Box 3046  
Valley Forge, PA  
19484-3046  
Robert Thomas  
1-800-833-2895



An Equal Opportunity Employer

**IS PROFESSIONALS**

Opportunities abound in the Southeast for talented, experienced (3 years minimum) Programmers, Senior PA's and DBA's. Join our talented staff and work in state-of-the-art environments on challenging projects:

- Communications Capacity Analyst - T1, X.25, decnet satellite
- HP3000, COBOL, Powerhouse
- DB2, CSP
- VAX, Fortran, Ingres 4GL
- IMS DB/DC, CICS, COBOL II
- HP3000, COBOL, WDS, Financials
- DB2, Telon
- Macintosh, C++
- OS2/PM, C++

We offer excellent compensation, relocation assistance, full benefit package and education reimbursement. Send your resume TODAY!



**AMERICAN COMPUTER PROFESSIONALS**  
140 Stoneridge Drive  
Suite 350  
Columbia, SC 29210  
800-933-9227  
Fax: 803-779-1955  
Equal Opportunity Employer

Micro Computer Support Specialist/Implementation Manager, FL. Using knowl. of & familiarity with Mexican, Venezuelan, Costa Rican, Guatemalan, & Ecuadorian \$ & non-\$ payment systems, & installation of Cubit 1.9 U4, & on line rate module & Xportico, implement Worldlink, Worldlink transfer, Worldlink travel payment & \$ funds transfer. Install software for reconciliation & sales reporting of T/ checks. Dev./interface with systems or integrate telecom system. Diagnose system software & operator problems. Support customers with specific "customized appli." requirements. Dev. training projects for service reps. & support promotional activities for Spanish speaking customers. Provide tech. assistance & training to users. Bach. Deg. in Indus. Eng. or Computer Sc. 2 yrs. exp. on job or 2 yrs. exp. as Implementation Specialist. 2 yrs. job exp must include exp. with Dbase III, & Symphony. Knowl. of Latin American banking system. Fluency in Spanish. \$33,517 p.a., 40 hr/wk. Apply by resume to: Ms. Pat Ganno, Job Order No. 0704763. Job Service of Florida, P.O. Box C, Clearwater, Clearwater, FL 34618-4090.

**SYSTEMS ANALYST:** Analyze, design, develop, test and maintain insurance applications related to IBM midrange and IBM PS/2 workstations with expertise in database management. To analyze and design systems using case tools and develop software using communications protocols such as X.25 and LU6.2, Cobol, relational database management systems. Skills in development of competitive conversion tools for software from different vendors such as Unisys to IBM midrange systems. Familiarity with IBM mainframe would be an added advantage. Must have BS in Engineering/Computer Science and 2 years of experience. Must also have: (a) experience as Systems Programmer/Analyst in on-line, commercial applications on IBM AS/400 and IBM PS/2 with client liaison and training skills; (b) Proven skills in Excelerator, OS/400, COBOL/400, SQL/400, QUERY/400, SDA, RLU, CL, APPC, PC/SUPPORT, REALIA COBOL, SCREENIO, DOS, DFV, C; (c) Familiar with MVS, CMS, VM/SP, JCL, VSAM on IBM mainframe. Salary \$36,000 per year for 40 hours/week. Must have proof of legal authority to work in the US. Qualified applicant contact: GEORGIA DEPARTMENT OF LABOR, Job Order # GA 5581541, 2972 Ask-Kay Drive, Smyrna, GA 30082 or the nearest Georgia Job Service Center.

Keith Reichle, CPC  
Systems Search, Inc.  
203 Heritage Park  
Lake Wylie, SC 29710  
803/831-2129  
(Local to Charlotte NC)

**Database Administrator**

**R**UBBERMAID, America's second most admired company (Fortune Magazine, 1991), has grown 400% since 1981 and has been profitable every year since 1937. To keep us growing and changing, we need you NOW if you are a large IBM system DBA who needs a new challenge.

Reporting to the Division Vice President, MIS, you will manage a staff of 4 and will implement and maintain database applications; recommend productivity/efficiency improvements; and be one of the key players in a planned DBMS upgrade.

7+ years' total MIS experience (3+ years of which must have been spent performing the duties specified above in an IBM IDMS environment) is required. Exposure to DB2 would be a definite advantage.

Mail your resume to: Ted Moore, Division Recruiter, Home Products Division, Dept. MDR.

**Rubbermaid, Incorporated**  
1147 Akron Rd.  
Wooster, OH 44691-6000

Please, no phone calls or agency referrals. We regret we can reply only to candidates in whom we are interested, but all resumes will be retained for 1 year.

**Rubbermaid**®

An Equal Opportunity Employer M/F/D/V  
We comply with the Drug-Free Workplace Act

**NO DOWNTIME****One Resume – 100's of Assignment Possibilities**

Keep working by simply forwarding a resume to our National Recruiting Center and The Experts will electronically distribute it to their national branches, network affiliates, and franchise locations. Get a world of attention with just one contact.

Our programmers and software engineering employees enjoy weekly pay, a wide variety of projects, resume and interview guidance, and star treatment. Many positions are salaried with benefits.

Here are a few of this week's requirements:

- OS/2
- DB 2
- IMS DB DC
- AS 400-RPG III
- UNIX C
- CLIENT SERVER
- SYBASE
- CASE TOOLS
- OS 2, C++
- ADABAS NATURAL

At The Experts – time is money!! Don't waste either – Fax or mail resume immediately to The Experts National Recruiting Center, One Washington Street, Wellesley, MA 02181. FAX (617) 237-2118.



... "It Takes One to Know One"

**Put Your Ingenuity to the Test**

Selmann, Cobb & Bryant, Inc. is not only a management and data processing consulting firm but is also in the business of applying the right people to the right tasks in order to meet the needs of our clients and achieve the results they seek. We are currently looking for individuals possessing any of the following skills to fill PROGRAMMER ANALYST positions in our locations throughout the country:

- PC Experience
- GUPTA
- TELON
- COBOL
- IMS DB/DC
- CICS
- IDMS
- DB2
- CASE TOOLS
- UNIX
- INFORMIX
- UNISYS
- AS400
- S/38
- RPG

Selmann, Cobb & Bryant, Inc. also offers a comprehensive insurance package, employee stock option plan and a 401K program. Take your first step toward making your career complete by sending or faxing your resume to:

**Selmann, Cobb & Bryant, Inc.**  
1365 W. Brierbraak Road  
Memphis, TN 38138  
Fax: 901-754-8463 1-800-221-1640

**Systems Manager**

Prestigious international consulting firm is seeking a technically-proficient Systems Manager and Analyst for its state-of-the-art Northern New Jersey facility. Responsibilities of this leading-edge opportunity include:

- supporting and maintaining the Company's internal financial information system and database (an SQL-Server application);
- assisting the national finance and administrative staff in the use of the system; and
- providing liaison between the Company's systems support group and the national finance and administrative staff.

The selected candidate must have 3-5 years' experience supporting financial, accounting and information systems along with a strong background in OS/2, MS-DOS, and Windows operating systems. Additionally, a working knowledge of SQL and Microsoft's LAN Manager is necessary. Good communication skills are important.

Please send resume, including salary history, to: Box #T-53/CW, 29 West 35th Street, 7th Floor, New York, NY 10001.

An equal opportunity employer

# UNIX\*

## Systems Engineer ISV Support Summit, New Jersey

You will provide support to ISVs writing software for our UNIX Desktop OS and help ISVs develop applications for our next generation customized GUI, UNIX OS/NW product.

We require 2 years' industrial technical UNIX OS/NetWare SW foundation at system level. A BSCS or equivalent a must. Previous UNIX/C SW Development/Technical Support/Systems Engineering with NetWare, DOS, Windows (X & DOS) experience on Suns, Macs, NeXT, PC compatibles or related systems are a plus. Intel 80X86 architecture SW knowledge preferred.

Univel is not just any start-up -- we're backed by the resources of Novell and UNIX System Labs. To become a part of this unique team, please send your resume to: Judy Garrett, Univel, Inc. 2180 Fortune Drive, San Jose, CA 95131. Phone (408) 321-1306, FAX (408) 473-8774. Email: Jgarrett@cup.portal.com. Univel is proud to be an equal opportunity employer.

**univel**®

UNIVEL A PARTNERSHIP OF NOVELL AND SUN

\*Trademarks are registered to their respective companies.

**PROGRAMMER/ANALYST**

HANCOCK BANK OF MISSISSIPPI is seeking experienced Programmer/Analyst.

Most qualified candidates will possess:

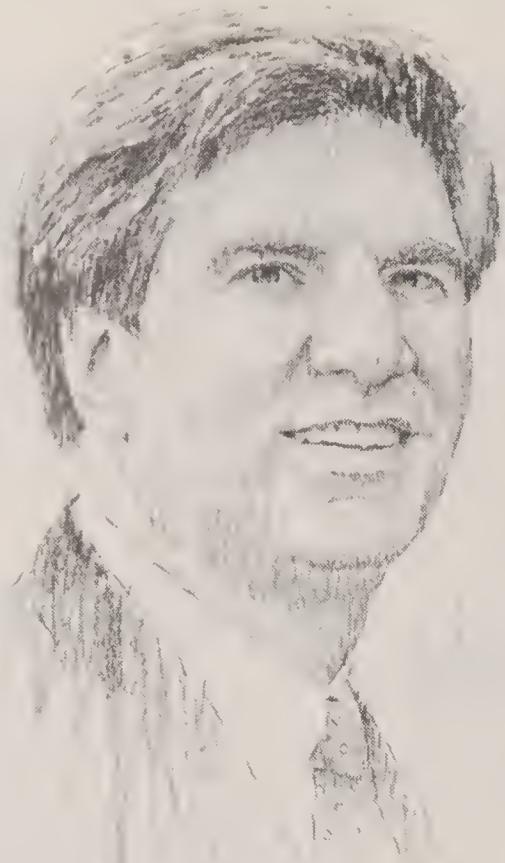
- Computer Science degree or equivalent programming experience.
- Minimum two (2) yrs. exp. in IBM MVS environment.
- Proficiency in COBOL, VSAM, CICS and MVS/JCL.

Preference will be given to candidates possessing banking application experience in SYSTEMATICS software.

If you are interested in an opportunity to grow in an aggressive multi-state banking environment, and seek a high-quality life-style on the MISSISSIPPI GULF COAST send resume with salary history to:

**HANCOCK**  
**BANK**

Personnel Dept., P.O. Box 4019, Gulfport, MS 39503 E.O.E.



# "...Computerworld Direct Response Cards deliver results directly to our bottom line."

Joe Allegra  
President  
Princeton SOFTECH, Inc.

At Princeton SOFTECH, revenues have more than doubled in the past year and business is booming. In addition to its headquarters in Princeton, New Jersey, the company boasts a network of nine international distributors and just recently opened a European office in Amsterdam. With its salesforce firmly in place, President Joe Allegro faces the challenge of finding the best prospects for a unique mainframe software product, Version Merger.

"In a nutshell, Version Merger accelerates the reconciliation of multiple versions of application systems. Since companies typically purchase off-the-shelf software and then make modifications to fit their own internal requirements, they must also make the necessary upgrades every time a new version is released. With Version Merger, much of that task is accomplished automatically. By identifying and reconciling conflicts between internal customized software and vendor changes in new releases, Version Merger automates all aspects of the upgrading process.

"For users of IBM's MVS operating system, this means reduced programming time, quicker introduction of the new functionality, and increased application quality. By simply implementing Version Merger, our clients tell us that they experience a 50% reduction in the time required to introduce an upgrade. At Princeton SOFTECH, then, our goal is to get this message out to large mainframe-using organizations in the financial, insurance, pharmaceutical, and manufacturing sectors, as well as to application software companies.

"To reach project managers within sites responsible for maintaining and upgrading application systems, card deck advertising has really paid off. Computerworld's Direct Response Cards, in particular, have helped us achieve widespread success in finding individuals actually plugged by

upgrade problems. With its longstanding reputation as the industry's news leader, Computerworld delivers a large paid circulation that definitely works to our benefit.

"And the proof is in the pudding, so to speak. With each Computerworld Direct Response Card we run, we receive lots of responses. At least 40 of these responses were very solid leads. More importantly, with our revenue tracking system, we can trace substantial dollars in product sales right back to these leads. The numbers are conclusive: Computerworld Direct Response Cards deliver results directly to our bottom line.

"Deck after deck, Computerworld Direct Response Card advertising has been effective in helping us target our best prospects for Version Merger and in increasing market awareness for Princeton SOFTECH. Not only do we plan to increase our 1992 frequency schedule, but we also are looking to advertise two new products in Computerworld Direct Response Cards upon their release mid-year."

Every month, Computerworld Direct Response Cards give you a cost-effective way to reach Computerworld's powerful buying audience of over 136,000 computer professionals. They're delivering bottom-line results for Princeton SOFTECH - and they can work for you. Call Norma Tomburro, National Account Manager, Computerworld Direct Response Cards, at 201/587-0090 to reserve your space today.

## COMPUTERWORLD DIRECT RESPONSE CARDS

Where you get direct access to quality sales leads.

1 800 343-6474  
IN MA 508 879-0700





# "In computer trade press advertising, Computerworld Direct Response Cards are first in quantity and quality - and lowest in cost per qualified lead."

- Charles A. Mills  
President  
Firesign Computer Company

Firesign Computer Company is a data communications software developer with 17 years in the business. Having tripled in size during the past two years, this San Francisco-based company retains rep firms on the East Coast and in Europe to service a worldwide customer base that extends as far as Australia and New Zealand. For President Chuck Mills, finding new sales prospects for the company's flagship product Outbound means advertising in *Computerworld Direct Response Cards* every month.

"Outbound's claim to fame is unattended file transfer. Supporting MVS and VM mainframes and OS/2, DOS, and Windows PC networks, it is the only product whose main thrust is unattended mainframe-to-PC file transfer. Virtually invisible to the PC user, Outbound saves time, provides flexibility, and eliminates training - all while automatically ensuring consistent reliability.

"By its very nature, Outbound has a cross-industry and cross-functional appeal, with potential users ranging from mainframe network software managers to information center professionals to project analysts. So when it comes to targeting our audience, we need a broad-spectrum advertising vehicle with a broad reader base. It's no surprise, then, that *Computerworld Direct Response Cards* have proven to be our best choice.

"In computer trade press advertising, *Computerworld Direct Response Cards* are first in quantity and quality - and lowest in cost per qualified lead. They consistently generate over 70 responses every month - and a full two-thirds are very qualified leads. Some months, we've even received as many as 120 responses. On a cost-per-lead basis, *Computerworld Direct Response Cards* are also our best value dollarwise.

"As an added benefit, I see *Computerworld Direct Response Cards* having an equalizer effect. Here, unlike other advertising vehicles, companies with smaller advertising budgets like ours stand out and make just as big an impact as much larger companies. *Computerworld's* large circulation also gives us reach to the right cross-section of potential buyers. And, since we continue to receive responses for many weeks after each deck hits, we obviously benefit from both a long shelf life and an active pass-along readership.

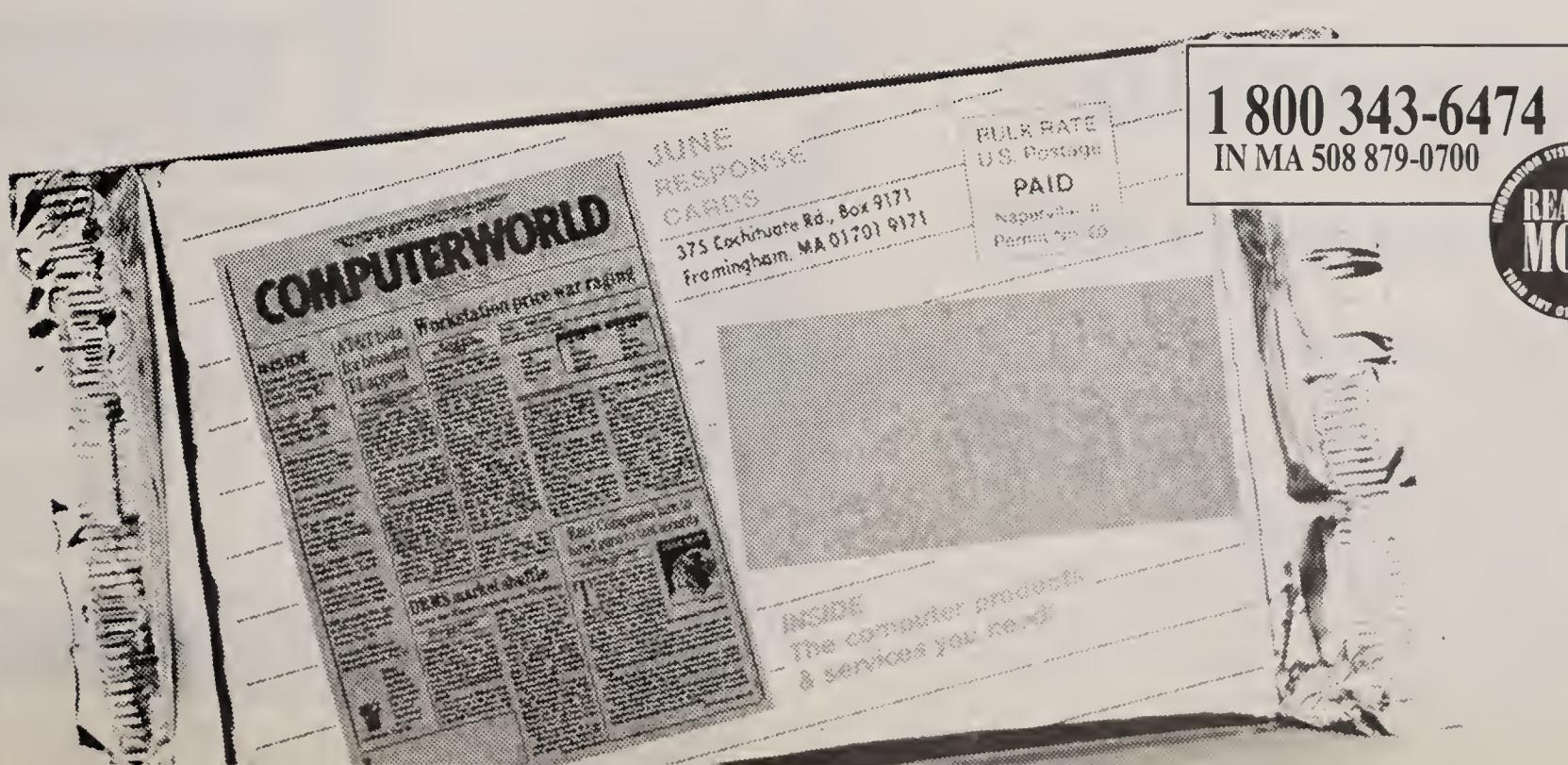
"As long as *Computerworld Direct Response Cards* remain our top lead generator, we'll definitely maintain our advertising presence in every deck. Looking ahead, I also foresee expanding our *Computerworld Direct Response Card* advertising should we develop a new data communication software product requiring similar exposure."

*Computerworld Direct Response Cards* give you a cost-effective way to reach *Computerworld's* powerful buying audience of over 135,000 computer professionals. Every month. They're working for Firesign Computer Company - and they can work for you. Call Norma Tamburrino, National Account Manager, Computerworld Direct Response Cards, at (201)587-0090 to reserve your space today.

## COMPUTERWORLD DIRECT RESPONSE CARDS

Where you get direct access to quality sales leads.

1 800 343-6474  
IN MA 508 879-0700





## "...Our recruitment advertising in Computerworld has positioned us as America's leading CASE recruiting firm."

- Kurt Wilkinson  
Vice President,  
Advanced Technology Practice  
Halbrecht & Company, Inc.

True to its motto, "Your Competitive Edge...Is People," Halbrecht & Company is well on its way to claiming top spot as America's leading CASE recruitment firm. With almost 20 years in the business and offices in Fairfax, VA, Old Greenwich, CT, and New York, NY, the firm provides national search and recruiting services on a contingency, and executive search basis. For Kurt "CASE" Wilkinson, Vice President, Advanced Technology Practice, recruitment advertising in *Computerworld* fulfills a two-fold purpose: generating quality resumes and maintaining its premier image among clients.

"Because of our expertise in leading-edge technologies, our clients look to us as management consultants rather than simply recruiters. So it's crucial that we focus on senior-level CASE tool and methodology professionals with strong I/S backgrounds. Our clients, including Fortune 500 companies, CASE tool vendors, and large consulting firms, typically have requirements for information engineers, senior consultants, data modelers, and I/S planners. Our recruitment advertising in *Computerworld* has positioned us as America's leading CASE recruiting firm.

"We consistently get up to 40 responses for every *Computerworld* recruitment advertisement we run. Since June 1988 we've placed over 70 I/S professionals in CASE positions, and a significant percentage have been direct placements from our *Computerworld* advertising. In fact, our statistics indicate that recruitment advertising in *Computerworld* attracts more qualified and placeable CASE candidates than any other source.

"In addition to generating resumes that closely match job specifications, we also get other valuable benefits from our *Computerworld* recruitment advertising. For example, the advertisement we ran prior to attending CASE WORLD in Chicago opened new doors with contacts that I otherwise would not have made at the show. Also, ongoing contacts we establish at companies, as well as referrals from vendors who recognize our name, help us secure future placements and even acquire new clients. Dollar for dollar, our national recruitment advertising in *Computerworld* is significantly more effective than classified advertising in local newspapers.

"Right now I believe we are strategically positioned to facilitate the hiring cycle for candidates and clients, whether they are vendors, consulting types or end-users. This market is still in its infancy, with the major growth period still ahead in the 90's. Our greatest challenge is maintaining a competitive edge. As we continue marketing long-term, Halbrecht & Company is dedicated to strengthening its market focus and positioning through its highly successful recruitment advertising program in *Computerworld*."

*Computerworld*. It's where serious employers - like Kurt Wilkinson - reach qualified candidates with key computer skills. Every week. Whether you use computers, make computers, or sell products and services for computers, *Computerworld* can help you recruit the experienced professionals your business demands. For all the facts, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).

## COMPUTERWORLD

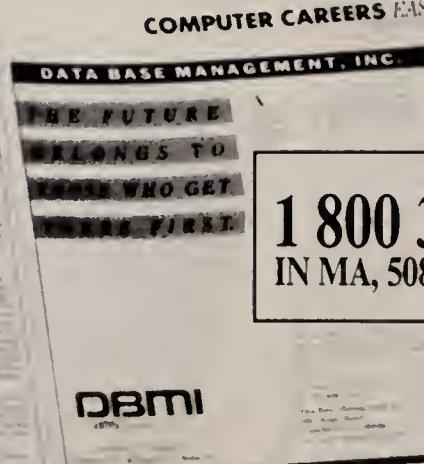
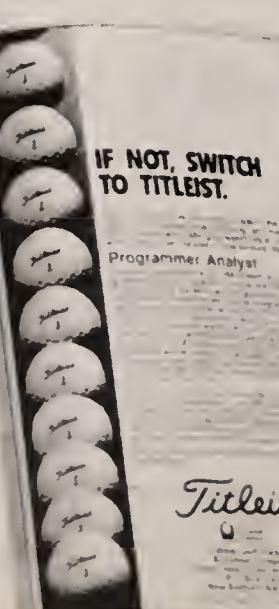
Where the qualified candidates look. Every week.

# COMPUTERWORLD

## COMPUTER CAREERS

The hotel welcome mat is out

WITHIN FIVE YEARS



1 800 343-6474  
IN MA, 508 879-0700



TELON DB2

## SOFTWARE CONSULTANTS

We're The Registry a dynamic, rapidly growing Software Consulting Company with unique and highly challenging assignments for both Software Engineers and MIS programmers at all levels of experience.

### NATIONAL

WINDOWS / C++  
ACMS / RDB  
VAX / 1032  
MUMPS  
ORACLE  
ALL-IN-ONE  
  
Contact: Dan  
(800) 248-9119  
FAX: (617) 237-0723

### ATLANTA, GA

OPENVIEW / HP  
ASSEMBLER CICS  
Windows/Smalltalk/C++  
VAX / ALL-IN-ONE  
SYBASE  
UNIX / C  
  
Contact: Jeff  
(800) 255-9119  
FAX: (404) 257-0566

### BOSTON, MA

AS400/RPG III  
POWERBUILDER  
VISUAL BASIC  
DATA MODELLERS  
MICROFOCUS COBOL  
MSWINDOWS / SYBASE  
  
Contact: Jim  
(800) 248-9119  
FAX: (617) 237-0723

### CHICAGO, IL

CASE TOOL DESIGNER  
CASE / IE  
Uniface/POWERBUILDER  
M&D / HR  
CAD / UNIX  
CLIENT SERVER  
  
Contact: Kyle  
(800) 677-9119  
FAX: (312) 558-1388

### CLEVELAND, OH

HOGAN  
CICS  
DB - 2  
IMS DB / DC  
TESSERAC  
SAQ  
  
Contact: Ed  
(216) 328-9900  
FAX: (216) 328-9338

### DURHAM, NC

POWERBUILDER  
VAX SQL FORMS  
PATHWORKS  
DB2 CSP  
UNIX ORACLE C++  
IDEAL DATACOM CICS  
  
Contact: Chris Blair  
(800) 338-9119  
FAX: (919) 544-9668

### MCLEAN, VA

ORACLE  
SQL FORMS  
ADA  
IEF  
VMS, C  
DECWRITE  
  
Contact: Bill  
(800) 367-9119  
FAX: (703) 790-8467

### RICHMOND, VA

DB2 / APS  
IMS / DB / DC  
COBOL/CICS/VSAM  
SQL / WINDOWS  
MSWINDOWS/ PARADOX  
IMS SYSTEMS PROG  
  
Contact: Mary  
(804) 747-1000  
FAX: (804) 346-0510

### WHITE PLAINS, NY

ORACLE  
UNIX SYS ADMIN  
LBMS / CASE  
SMALLTALK  
DB2 / CSP  
SYBASE / UNIX / C  
  
Contact: Susan  
(914) 937-9119  
FAX: (914) 937-3314

### WHITE PLAINS, NY

An Affirmative  
Action/Equal  
Opportunity Employer

# The Registry

Member NACCB

## FLORIDA PROFESSIONAL CAREERS

Immediate permanent and consulting opportunities for professionals with any one of the following skills:

SKILL	SALARY TO	SKILL	SALARY TO
UNIX/C	45K	IEF/IEW	55K
X-WINDOWS/GUI	42K	IDMS/ADSO	39K
DB2/SQL	45K	HP 3000	35K
CICS/COBOL	39K	INFORMIX	42K
FOCUS	45K	ORACLE VAX	48K
AS 400/RPG III	45K	MSA/M+D	45K
TANDEM/TAL/C	65K	ADABASE/NATURAL	42K
IMS DB/DC	42K	PACBASE	45K

### COMPUTERPEOPLE, Dept. 526

12225 28th St. N.  
St. Petersburg, FL 33718  
813-573-2826  
1-800-329-2626  
FAX 813-572-1153  
'Serving the Tampa  
Bay area'

20 N. Orange Ave.  
Orlando, FL 32801  
407-236-9706  
1-800-299-9953  
FAX 407-843-8153  
'Serving the Orlando area'

3265 Meridian Pkwy.  
Suite 1400  
Ft. Lauderdale, FL 33331  
305-384-0999  
1-800-777-8603  
'Serving South Florida  
& Jacksonville'

**COMPUTERPEOPLE**

## ORACLE

A leading consulting firm is seeking experienced Oracle Professionals to service its rapidly expanding client base. We are a client service oriented firm that specializes exclusively in the implementation and development of Oracle based applications. Successful candidates must possess a BS/BA degree, excellent oral/written communication skills, strong client management skills, as well as one or more of the following technical skills:

- SQL\*Forms 3.0/SQL\*Menu 5.0
- Oracle CASE
- Oracle\*Financials
- SQL\*Forms 2.3/Application Foundation
- Oracle DBA skills

We offer an extremely competitive compensation package as well as the best benefits in the industry. Interested parties should respond to: CW-94880, Computerworld, Box 9171, Framingham MA 01701-9171.

## Opportunities for Computer Professionals in Saudi Arabia

GiST, the largest Relations Database Management Co. in Saudi Arabia has openings for the following positions: CONSULTANT, TECHNICAL SUPPORT, SALES EXECUTIVE. Must have 5-10 years experience. We offer high tax free salary (\$4,000 up to \$8,000). Sales staff can make up to \$200,000 in commission, expat/repat tickets, housing, local transportation allowances.

### Qualifications:

- VMS, UNIX, DOS, OS/2 and Macintosh
- CASE Tool
- Strategy and Design
- Project Planning
- Performance Reviews
- Ingres experience and RDBMS knowledge is a must
- Automated Development Life Cycle

Candidates meeting the above requirements, please send resume by Fax 011-966-1-464-1424. Attn: Mr. A. Morad.

## Professionals

### AS/400

P/A's - opportunities in a Dynamic Environment! Immediate openings for AS/400: COBOL 400/RPG 400 Coding skills, experienced with ASI products or other Distribution and order processing software plus. Send resume to: The McKinley Group, Inc., 115 Chester Street, Suite 5, Front Royal VA 22630 Fox: (703) 635-9211, Tele: (703) 635-9200

### TANDEM

COBOL, PATHWAY, TAL, SCOBOL, C, SQL/X 25  
**STRATUS**  
PL1, COBOL, C, ON/2  
**MUMPS**  
DSM, ISM, MSM, GTM, IBM RISC/6000 M-SQL Fulltime/Consulting Positions available in the US/ABROAD

### STRATEM

800-582-JOBS  
TEL (212)967-2910  
FAX (212)967-4205  
124 W. 30th St. Suite #302  
New York, N.Y.10001

### ENGINEERING

## Achieve New Heights With International Game Technology

International Game Technology continues the ascent, launching a worldwide expansion into Europe, Canada and Australia. IGT, long the world leader in electronic gaming technology, has emerged as the dominant manufacturer of on-line video lottery systems and terminals. The history of International Game Technology is marked by explosive growth and product achievement, as evidenced in 1991 when IGT was announced as the top performing NYSE stock. Our family of wide-area game control systems has transformed the industry.

IGT products are characterized by strong player appeal, sophisticated security, world-renowned graphics, high reliability and competitive pricing. We have a reputation as the most innovative and technologically adept of the gaming machine companies.

## MANAGEMENT OPPORTUNITIES

Our success has created the need for leadership in software development at our Reno-based Research & Development center:

We are seeking driven engineering professionals who become excited with new challenges and can share our unparalleled commitment to excellence. Strength in leadership and ability to communicate enthusiasm to a team of dedicated engineers in a fast-paced, high output environment is paramount.

### Software Development

Proven experience in structured programming, module development and documentation is imperative. Must possess working knowledge of VAX/VMS and relational database development/administration or real-time programming and C language. Computer Science or Computer Engineering degree required. Masters in Computer Science preferred.

### Firmware Development

Requires strong experience in 8051 family firmware development in assembly language. Also requires strong experience in firmware development in C language, 80960 experience desirable. In-circuit emulation and VAX/VMS experience required. BS degree in Electrical or Computer Engineering, or Electronic Engineering Technology required. Masters in Electrical or Computer Engineering preferred.

## ENGINEERING OPPORTUNITIES

### Firmware Engineers

BSEE or Masters Degree in Electrical or Computer Engineering or BS in Systems Engineering Technology or Electronic Engineering Technology required. 1-3 years experience in 8032/8051/80960 firmware development in C and Assembly language required. Video graphics, real-time control, communications, in-circuit emulators, DOS and VAX/VMS experience desired.

### Software Engineers (Database)

Requires experience in the following: 4GL, C, Progress, Ingress, Oracle on VMS platform, CASE, Relational databases, Networking. Prefer experience in structured design, electronic fund transfer and VAX/VMS using Progress. Requires BSCS or BSCE.

### Software Engineers (Systems)

Must be experienced in VMS, C, CASE, Ethernet, code control and networking. Desire substantial structured design/CASE experience. Requires BSCS or BSCE.

### Software Engineers (Engineering Services)

Must have experience with C and Assembly. Windows experience desired. BSEE, BSCS or BSCE degree required, IBM PC's experience a must.

### Mechanical Engineers

Responsibilities include electro-mechanical packaging design with implementation from concept through production. 1-3 years experience in packaging design preferred. Knowledge of sheet metal fabrication, injection molding, die casting and metal stamping required. AutoCad and material/coin handling experience desired. BSME necessary to qualify.

Background investigations will be conducted for all positions and gaming cards will be required.

Nevada offers a kaleidoscope of recreational advantages, low-density population, no personal or state income tax and affordable housing. Add to these attributes the opportunities for non-stop satisfaction working in a stimulating environment ready made for the technology-craving professional, and the sum total is a quality lifestyle.

In exchange for your talents we offer an excellent compensation and benefits package. If you would like to make a positive change in your life, look to International Game Technology.

These are immediate openings. For prompt, confidential consideration, please send your resume (indicating position of interest), including salary history, to:



MANAGER OF  
HUMAN RESOURCES  
International Game Technology  
520 South Rock Boulevard  
Reno, Nevada 89502

We do not discriminate on the basis of sex, race, religion, color, national origin, age or disability. We are proud to be a Drug Free workplace.

Search...

OS/2 Opportunities

Programmer/

Analysts

# OS/2

AGS, a NYNEX® Company, employs over 2,500 computer professionals in 50 offices in the U.S., Canada and England.

We have immediate opportunities for professionals with experience in any of the following areas:

- OS/2 Testing
- OS/2 VGA/XGA Graphics
- OS/2, C Development
- OS/2 PM Printer Drivers
- OS/2 Internals
- OS/2 Kernel Debugging
- MACH Microkernel

**AGS**  
A NYNEX Company

An Equal Opportunity Employer M/F/H/V  
AGS is a drug-testing employer

Please send your resume in confidence to:

AGS Information Services, Inc.  
Attn: Department JC  
777 Yamato Road, Suite 450  
Boca Raton, FL 33431  
FAX: 407-998-9339  
Phone: 1-800-HIRE-AGS or 1-800-846-7078

RCG Information Technology is one of the fastest growing data processing consulting firms in the country with annual revenues of over \$70 million, 10 offices from coast to coast, and over 700 consultants. And because we're growing so fast we have a constant, high volume need for data processing professionals all over the country.

That is why we're establishing a national network of recruiters – professional recruiters and people with a technical background – to interview and videotape data processing professionals and recommend the top talent to us.

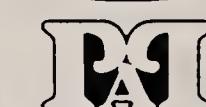
For more information on the RCG Information Network, **CALL, FAX, or MAIL** your resume to: **BOB BEAUDET, TOLL-FREE (800) 942-9269, FAX: (212) 398-6189, 111 West 40th Street, 27th Floor, New York, NY 10018**. We are an equal opportunity employer.

## RCG INFORMATION TECHNOLOGY

TECHNICAL SYSTEMS ANALYST. 40 hours per week, 8:00 a.m. to 5:00 p.m. Salary \$26,000.00 per year. Analyze, develop, design, install, test and service graphic arts applications systems (including hardware and software) for electronic imaging and/or desktop publishing, primarily on Macintosh, including Adobe Illustrator, Aldus Freehand, Adobe Photoshop, QuarkXpress, Aldus PageMaker, Macromind Director, HyperText, and Aldus Persuasion. Design networking and connectivity systems to integrate Macintosh with other PC and mid-frame platforms. Install and support graphic and print servers (for processing large graphic files) to store, transport and download high-resolution TIFF color images, OPI files, and transmit large graphic files to remote locations using remote communications. Applicant must possess bachelors degree in electrical engineering, computer engineering or computer science. Must have take one course in each of (a) digital systems; (b) digital logic; (c) computer organization and assembly language; and (d) programming/applications on microcomputers. Must have an aggregate of one year of experience in the installation, networking and/or instruction in microcomputers (with or without degree). Employer paid ad. Send resumes to 7310 Woodward Avenue, Room 415, Detroit, Michigan 48202. Reference Number: 67692

## CA & AZ CONTRACTS

### CONSULTANTS WANTED



P. Murphy & Associates, Inc.  
4405 RIVERSIDE DR., SUITE 100  
BURBANK, CA 91505  
(818) 841-2002 (714) 552-0506  
FAX: (818) 841-2122  
Member NACCB

## TECHNICAL PROFESSIONALS/RECRUITERS

Computer Programmer & Operator - 40 hr. week 9AM to 5PM, salary \$18.00 per hour. Individual to prepare programs in English & Arabic, operate computers & input information both in English & Arabic. Supervise other operators, act as a programmer 30% of time & act as an operator & supervisor 70% of time, this may vary. Must be able to write programs in Arabic. 2 yrs. of college with Associate Degree in Computer Science. 2 yrs exp. in job offered req. Blue Island, Illinois. Must have proof of legal authority to work permanently in the U.S. Send resumes to: Illinois Dept. of Employment Security: 401 S. State St. - 3 South; Chicago, IL 60605; Attn: Gordon Doliber. No Calls. Ref. #V-IL 5872-G, an employer paid ad.

SOFTWARE ENGINEER - 40 hrs./wk., 8am-5pm, \$40,000.00 per yr. To analyze, design and develop manufacturing and financial software application systems utilizing UNISYS A-Series hardware, COBOL 74, COMS, WFL, MARC, DMSII and LINC 14 software. Maintain and enhance systems and write new programs. Requires Bachelor's Degree in Computer Science, Electrical or Mechanical Engineering, 2 years experience in job offered or 2 years experience as Systems Analyst/Programmer. Must have experience with UNISYS A-Series, MARC, COBOL, WFL, COMS, Item Processing and Image Item Processing systems. "Employer paid ad". Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref. No: 78692.

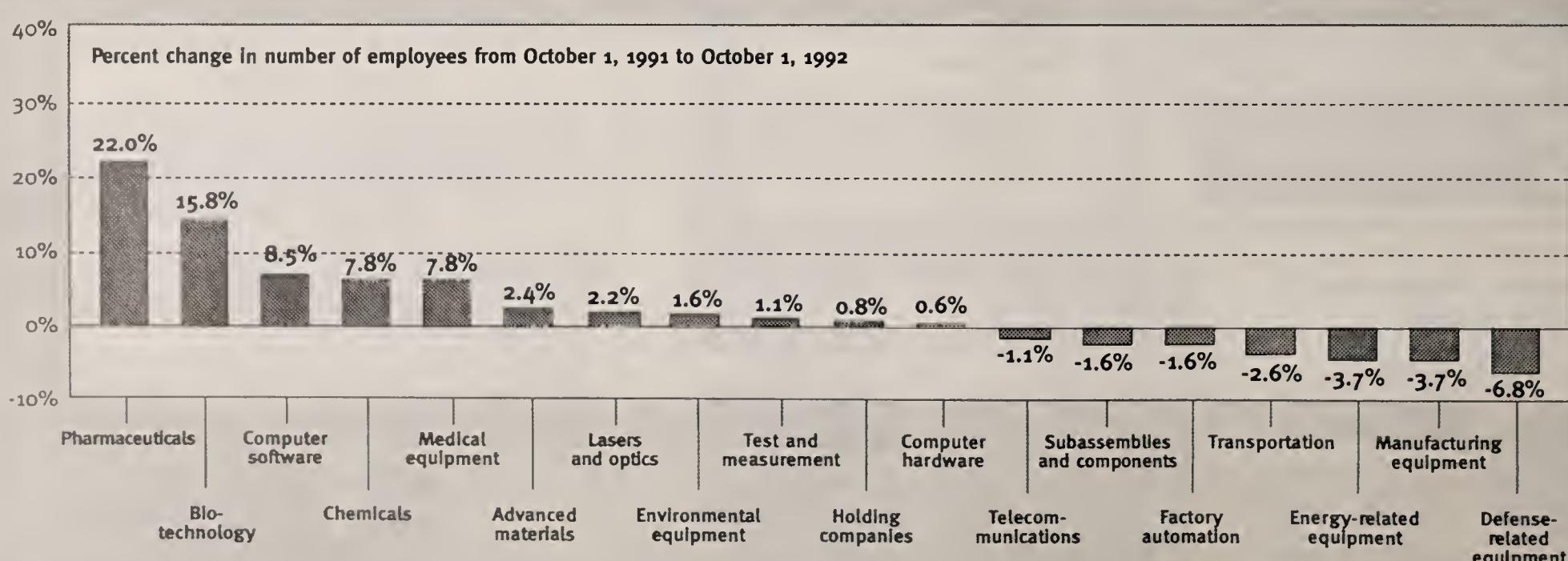
## Hiring Managers

Recruit qualified computer and communications professionals with the **IDG Communications Computer Careers** Network of five leading computer newspapers. For more details, Call Lisa McGrath at:

**(800) 343-6474**  
(in MA, 508/879-0700)

## Computerworld/CorpTech Career Index

Of the 4,096 technology manufacturers surveyed by CorpTech during the past three months, 22% expanded their work force while 17% experienced either shrinking employee counts or business failure. The remaining firms indicated stable employment.



Source: Corporate Technology Information Services, Inc.

## Information Systems Professionals

**Battelle, Pacific Northwest Laboratories** has immediate needs for INFORMATION SYSTEMS professionals. We are an internal Information Systems Department supporting a rapidly expanding multi-program national laboratory with missions in Energy Research and Environmental Preservation and Restoration. We conduct over 1,700 research projects for 94 federal and state agencies and 302 industry clients. We are building a laboratory without walls, where information and data can be freely exchanged. Outstanding opportunities exist for growth while you are working to build state-of-the-art information technology.

All positions require a Bachelor's degree in science or engineering.

- APPLICATIONS DEVELOPMENT ANALYSTS
- DISTRIBUTED COMPUTING ENGINEERS
- NETWORK OPERATIONS ENGINEERS
- CUSTOMER SERVICE/HELP DESK REPRESENTATIVES
- SENIOR SYSTEMS ENGINEERS

We are located in southeast Washington with all the advantages of a small community life style, excellent schools and the unique recreational opportunities of the great Northwest. We offer outstanding facilities and equipment, excellent benefits and competitive salaries.

To be considered, please FAX your resume to (509) 376-9099 or send to: **Battelle, Pacific Northwest Laboratories, Dept. 5051ARJ, P.O. Box 999, Richland, WA 99352**. We are an equal opportunity employer. Women and minorities are encouraged to apply. Legal Right to Work in the U.S. Required.

 **Battelle**

...Putting Technology To Work

## I-CASE PROFESSIONALS

Claremont Consulting Group is a three year old, high growth software consulting firm utilizing IEF and PACBASE CASE technology. Our outstanding track record has resulted in multiple opportunities across the country for consultants and team leaders in the following areas:

### IEF

We are seeking IEF professionals with a minimum of one year experience (BAA or BSD or equivalent) preferably with formal training and one full life cycle. You will be an integral team member on a highly visible leading edge project including Version 5.1/UNIX implementation.

### PACBASE

Working as a key team member on a large project, you must have a minimum of 3-5 years' DP experience with DB2 or other relational data base experience. Customer interface and facilitation skills along with full lifecycle, large project expertise highly desirable. Knowledge of CASE tools very helpful.

We offer excellent employer-paid benefits and unsurpassed professional opportunities. Relocation assistance will also be provided. Forward your resume outlining experience along with a cover letter to: David Raboin, HR Manager, Claremont Consulting Group, 1600 NW Compton Drive, Suite 210, Beaverton, Oregon, 97006. Or, FAX your resume to us at (503) 690-4006. We are an equal opportunity employer.



claremont  
Consulting Group, Inc.

## Give your career the competitive EDGE

As an experienced computer professional, you know what's needed to stay sharp. You need to build on your experience, be on top of breakthrough technology and find the challenges which keep you motivated. You can accomplish this as a consultant with TRECOM while experiencing the best of both worlds — a position with an established and well-respected company, and the challenges of working on new projects with leading Fortune 500 companies.

TRECOM is currently staffing a new development project with our most prestigious client. We require the following team of highly motivated professionals:

- Senior MS-WINDOWS Developers
- SYBASE Developers
- C/C++/UNIX Developers
 

Relational database experience a must. MOTIF and TUXEDO a big plus.
- Senior Database Architects
 

8-10 years of Distributed Database experience a must.
- Senior Client/Server Test Coordinator
- Senior Client/Server Production Support Specialist
- ORACLE DBAs and Developers
 

SQL-FORMS 3.0 and PRO\*C
- GUPTA SQL WINDOWS Programmer

Please respond to: **Tracey Fitzsimmons, TRECOM Business Systems Inc., Dept. CW, 333 Thornall Street, Edison, NJ 08837-2246. Phone (908) 549-4100; FAX (908) 549-2375.**

TRECOM consultants earn excellent compensation which includes relocation allowance, medical/dental insurance, a 401(k) plan, and tuition reimbursement. We are an EEO/AA Employer.

**TRECOM**  
Business Systems Inc.

## Matching Talent To Technology... Coast To Coast

### SOFTWARE

- X.400, X.500, C, MESSAGING
- SYSTEM MANAGERS: ULTRIX, VMS, UNIX
- 8051, 680X0, C, RADIO COMMUNICATIONS
- DCE: OSF/1, UNIX OR VMS
- OSI, TCP/IP, DECNET, X.25
- X-WINDOWS/MOTIF, C
- ADA, VMS, UNIX, RATIONAL

### INFORMATION SYSTEMS

- ORACLE, SQL-FORMS, SQL-CASE
- ADW, CICS, DB2
- ACMS, RDB, ESQL, C
- CASE SOFTWARE PACKAGES
- AS/400, RPG, MRP PACKAGES
- DBA'S: ORACLE, RDB, DB2

**Contract SOLUTIONS.**

For more Local and National Opportunities, contact:

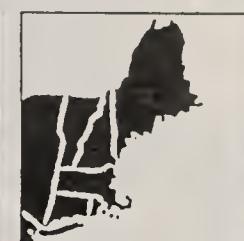
Two Keewaydin Drive  
Salem NH 03079-4875

603-893-6776 • 800-998-2741 • FAX 603-893-4208

## CONSULTING OPPORTUNITIES



Local.



Regional.



National.

The Computer Merchant, Ltd. has become the recognized source for software consulting excellence among Fortune 500 Companies. Due to expanding demand for our services, the following opportunities currently exist for experts with a minimum of 3 years experience:

**RALLY/RDB**  
**DB2/WALKER SYSTEMS**  
**AS-400/COBOL/RPG III\***  
**VAX/MUMPS**  
**OS/2 - MOTIF/GUI**  
**MODEL 204 P/As\***  
**POWERBUILDER\***

**PROGRESS**  
**VAX/PATHWORKS\***  
**POWERHOUSE P/As**  
**SECURITY ARCHITECT**  
**IDMS DBA**  
**ADABASE/NATURAL\***  
**ORACLE\***

\* Multiple Openings

For more information on The Computer Merchant, Ltd.'s professional services and opportunities, contact us by mail, fax or call:



## THE COMPUTER MERCHANT, LTD.

CORPORATE HEADQUARTERS

80 Washington St., Bldg. E, Norwell, MA 02061  
(617) 878-1070 FAX: (617) 878-4712

449 Pleasant Hill Rd., Suite 301 180 Newport Center Dr., Suite 180  
Lilburn, GA 30247 Newport Beach, CA 92660  
(404) 279-8009 (714) 720-8435  
Chicago, IL 60611  
(312) 751-4299

Systems Analyst; 40 hrs/wk; 9-5; \$34k/yr. Design and development of application systems based on Systems Application Architecture (SAA) using Yourdon and Jackson's methodology for customers including banks, public utility companies, manufacturing companies on IBM 3090 with MVS/XA using APS as special software and IBM PS/2 with OS/2 operating system and CASEPM as case tool; using DB2, CICS, VSAM and XPEDITOR. Must have an M.B.A. in Finance and at least 1 yr. experience in job offered or as Systems Analyst/Programmer or Systems Engineer. Experience must include 9 mos. On IBM 3090 with MVS/XA, DB2, CICS, APS, VSAM and XPEDITOR as special software and CASEPM as case tool using Yourdon and Jackson's methodology and Systems Application Architecture (SAA). Must have proof of legal authority to work permanently in the United States.

Send resumes to: Illinois Department of Employment Security, 401 S. State St., #3 South, Chicago, IL 60605. Attn: Joan Sykstus, Reference #V-IL 5760-S, 2 copies of your resume required. An Employer Paid Ad. NO CALLS

### COMPUTER PROFESSIONALS!

Southeast Locations!

Join one of the Southeast's fastest growing Computer Services firms. Currently recruiting professionals with at least 2 years experience in the following areas:

**SMALLTALK • OS/2 • WINDOWS GUI • OBJECT ORIENTED CODE NETWORKING**

**IBM: DB2, IMS DB/DC, CICS; banking, utility & manufacrtg apps.**

**DEC: INGRES, ORACLE**

We offer competitive salaries, excellent benefits & relocation package. Call and/or send resume to:

**Technology Solutions, Inc.**  
PO Box 212098  
Columbia, SC 29221-2098  
Fax: (803) 359-7031  
Tel: (803) 359-6079  
Toll Free: 800-849-4875

DMR Group, Inc., is an information management and technology consulting firm with over 2,200 professionals in 37 offices in North America, Europe and Australia. Our clients include private and public sector firms, including many Fortune 500. DMR is a leader in helping firms utilize information technology to transform their business and to better their competitors in effectively serving their customers. Through DMR's System Development Life Cycle Productivity Plus™ (P+), our consultants help clients deliver business-driven IT systems.

DMR's US Division has offices in the metropolitan areas of Boston, Los Angeles, New York, San Francisco and Seattle. We are currently seeking individuals with P+ experience

## METHODOLOGY CONSULTANTS

The ideal candidate will have a BSCS, or equivalent, and a minimum of 8 years of systems development experience using systems development methodology, P+ preferred. Experience should include structured analysis, data and process modeling, and working knowledge of CASE technology

If you fit this profile, have excellent people, facilitation, consulting, and communication skills (written and verbal) and would like to participate in the growth in the U.S. of an exciting international organization, please fax or mail your resume, indicating preferred location and current salary to DMR Group, Inc., U.S. Division Recruiting, Two Stamford Landing, 68 Southfield Avenue, Stamford, CT 06902 FAX 203-961-0198. An equal opportunity employer

**DMR**



**“... Because inquiries from Computerworld's Classified Marketplace are among the highest quality generated anywhere, we get ... the highest probability of closing.”**

- Julian Sandler  
President  
Brookvale Associates

A market leader in short-term VAX rentals, Brookvale Associates has been buying, selling, renting, and leasing new and used DEC components for 17 years. While its primary focus is on products in the mid-to-upper range, the company offers one of the most extensive inventories of Digital systems and peripherals - and maintains a professionally staffed systems lab and integration shop. To specifically make people aware of all the VAX options available, President Julian Sandler advertises in *Computerworld's Classified Marketplace* - every week.

“The people who we believe can benefit most from our custom-configured systems and customized solutions are MIS Directors and Vice Presidents, Vice Presidents of Finance, CIOs, and Managers of Technical Resources at the Fortune 1000 and Non-industrial Fortune 300. Clearly, *Computerworld* is what the industry reads first - plus it has a high pass-through rate and long shelf life. And its readers are the right readers - those with decision-making authority. So *Computerworld's* audience is the ideal customer set for us.

“So, when we advertise in *Computerworld's Classified Marketplace*, we're directly targeting an audience who has a high volume of Digital requirements - and influences the kind of purchases most appropriate to our expertise. That makes *Computerworld's Classified Marketplace* the ideal place to focus on the short-term rental needs of DEC customers.”

“As an advertiser, Brookvale Associates also wants to stand out. By offering a select segment of the Digital computer mar-

ket, *Computerworld's Classified Marketplace* gives us reach to a viable piece of business that's not available through DEC-specific publications. And because inquiries from *Computerworld's Classified Marketplace* are among the highest quality generated anywhere, we get a truly bonafide opportunity - and the highest probability of closing.

“Our weekly advertising generates a consistent stream of serious calls - not only at our headquarters in Hauppauge, New York, but also at our regional offices in Seattle and Minneapolis. *Computerworld's Classified Marketplace* is definitely where we want to be 51 times a year.”

*Computerworld's Classified Marketplace*. It's where computer buyers meet computer sellers. Every week. Sellers and buyers like Brookvale Associates who advertise in *Computerworld's Classified Marketplace* because it reaches over 629,000 information systems professionals. And because it works. To put your classified message into the hands of America's most powerful audience of buyers, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).

## **COMPUTERWORLD MARKETPLACE PAGES**

Where computer buyers meet computer sellers. Every week.

**1 800 343-6474  
IN MA 508 879-0700**



# **COMPUTERWORLD MARKETPLACE**

**INSIDE**  
OS/2 stays Microsoft leads DOS revival  
The new look of leasing systems

OS/2 stays Microsoft leads DOS revival  
The new look of leasing systems

# Marketplace

## Tips from three tough software testers

By Alan Radding



No one can afford to install a software package that contains even one time bomb or booby trap. Yet the

chances of doing so are higher as the market is deluged with untried Microsoft Corp. Windows programs.

While your software evaluators may have testing methods that work, it can't hurt for them to take stock of other procedures as PC-based systems take on more responsibility.

Read on to find out how three tough testers approach software evaluation.

### Getting started

Dave Grana, a planning assistant and a power user at Chevron USA Products Co. in Houston, begins with the documentation if it is a brand-new product. "It's not as bad as the early days of Windows, but you have to be careful if it's the vendor's first Windows program," he says. (For updates to proven products, he just loads the new version and lets it run.) Early Windows applications sometimes didn't boot up at all, locked up the mouse or crashed the entire system.

Just to be on the safe side, howev-

er, Grana makes an incremental backup of his system before installing the new software. He also checks to see if the application creates its own WIN.INI files, as opposed to appending existing files, making it easier to troubleshoot and deinstall the software.

Steven Birgfeld, manager of computing standards and support at Booz Allen & Hamilton, Inc. in McLean, Va., also begins by looking at the documentation. With programs he considers volatile, he creates a special directory and does a system backup.

On the opposite end, Joel Diamond, technical director of the Windows Users Group Network in Media, Pa., skips the documentation and goes right to the install procedures. He looks at embedded help files, tutorials and, especially, any README files. The reason: Some developers put more information than just how-to explanations in the Help files, he says.

To make it easy to extricate his system from any problem, Diamond uses tools developed by the Windows Users Group Network that save existing configuration files to an archive.

### Evaluation

Once assured that the software can be installed and deinstalled without a major crisis, the evaluators start

looking at the software itself.

Diamond is very concerned with how well the developer implemented the Windows interface. He reviews the screens, menus and messages to identify the features and customization options. He also examines the program's consumption of resources, particularly disk and memory use, and he times the minimum install procedure.

"I want to know how much disk space the program requires. That is not something the vendor reveals on the box," Diamond says. The vendor states a minimum configuration for running the program, which may not allow for adequate performance.

Birgfeld tests the application's features against a list of requirements drawn up by the end users. He scores the application for its must-have and would-be-nice features. He also exercises the data import/export capabilities.

When problems arise, Grana turns to utilities such as Windows' Dr. Watson and Norton Utilities (a set of PC management tools) to identify the problem and make corrections. "Say the program suddenly locks up. If I'm lucky, I can stay in Windows 3.1 and get over to Watson." Dr. Watson files record everything that happens to the system and are used in determining what has gone wrong.



### At a glance

**Read through documentation.** If you skip to install procedures, check out README files, which may contain more than how-to information. Also, back up your system before installing new software.

**Benchmark the application** in terms of hardware performance. You may also consider not doing a full install. Sample files, for example, can be easily skipped.

**When doing compatibility testing**, be sure to test the right version level. The only way to determine if a package contains the latest fix is to check for a date on the box or disks.

In addition, he will try to save and close whatever open files he can. He uses Norton Utilities to try to reconstruct damaged files.

When they can't solve a problem, the evaluators don't hesitate to call the vendor's technical support line.

### Compatibility testing

Compatibility testing is the final step in the evaluation process. The goal is to determine how the software works with the users' likely hardware and software combinations. Fortunately, most software now is network-friendly. "There is no way to test every compatibility concern," Birgfeld warns, but "make sure you are testing the right version level." Vendors may release unannounced or unnumbered releases of software containing a minor fix that changes the compatibility picture. The only way to determine in advance if a package contains the latest fix is to check for a date on the box or disks.

Evaluators rarely encounter a truly awful program anymore. "The worst thing is a program that just isn't easy to use," Birgfeld says.

Still, there is always the possibility of an unpleasant surprise in the next box that arrives on the software evaluator's desk. "In a market that moves as fast as the Windows market," Diamond says, "you're sure to find some lead balloons."

Radding is a free-lance writer based in Newton, Mass.

### Buy/Sell/Lease

#### New/Reconditioned digital Equipment

Whatever your requirements are for Digital Equipment, call CSI first! Buying, selling, trading, leasing, consignments - we do it all!

CSI sells all equipment with a 30 day unconditional guarantee on parts and labor and is eligible for DEC maintenance.

Offering systems, disk drives, tape drives, printers, terminals, memory, options, boards, upgrades and many more.

Distributors Wanted

**CSI** Compurex Systems, Inc.  
83 Eastman St.  
Easton, MA 02334  
1-800-426-5499  
In Mass. (508) 230-3700  
FAX (508) 238-8250

#### COMPUTERWORLD Product Classified Pages

Examines the issues while computer professionals examine your message. Call for all the details.

(800) 343-6474  
(In MA., 508/879-0700)

**IBM**  
RISC System/6000  
**Rentals**  
All Models

**Call (800) 858-1144**

**COMPUTER MARKETPLACE**

205 East 5th Street, Corona, CA 91719  
TEL (714) 735-2102 • FAX (714) 735-5717

**DEMSEY. WHERE IBM® QUALITY IS SECOND NATURE.**

- SERIES/1
- 9370
- RS/6000
- INDUSTRIAL PC
- ES/9000
- AS/400
- SYSTEM 36/38
- POINT OF SALE

**BUY-LEASE-SELL**

- Processors
- Peripherals
- Upgrades

For pretested equipment, flexible financing, configuration planning, technical support and overnight shipping call

**(800) 888-2000.**



**Dempsey**  
BUSINESS SYSTEMS

Where IBM Quality is Second Nature

18377 Beach Blvd., Suite 323 • Huntington Beach,  
CA 92648 • (714) 847-8486 • FAX (714) 847-3149

IBM is a registered trademark of International Business Machines Corporation

**IBM**

Authorized  
Distributor Product  
Integrator

## Buy/Sell/Lease

## TAKE NO RISK ON RISC SYSTEM/6000

Choose: **DATA TREND**

## RISC System/6000 Hardware:

RISC System/6000 Services:

## RISC System/6000 Engineering:

Complete systems, upgrades, trades, peripherals, parts  
 Series/1 to RS/6000 Migration, AIX Support/Consultation, Application  
 Re-engineering, Consolidation Services, Data Conversion Services  
 Custom Re-configuration, Refurbishment, Complex Systems  
 Integration, Cable Systems Design/Installation, Field Installation, Board  
 Level Repair, Project Packing Services, Configuration Documentation

Enterprise Services  
 Enterprise-wide planning, Host  
 Connectivity, Process Control,  
 RDBMS Incorporation, Complex  
 Systems Integration, Network  
 Solutions, DAE Incorporation



10250 Valley View Rd., Suite 149, Eden Prairie, MN 55344

## BUY • SELL • LEASE

Series/1  
 System 36/38  
 AS/400  
 937X, 4300, 468X  
 PS/2, Industrial PC

Call the "Reliability Company"

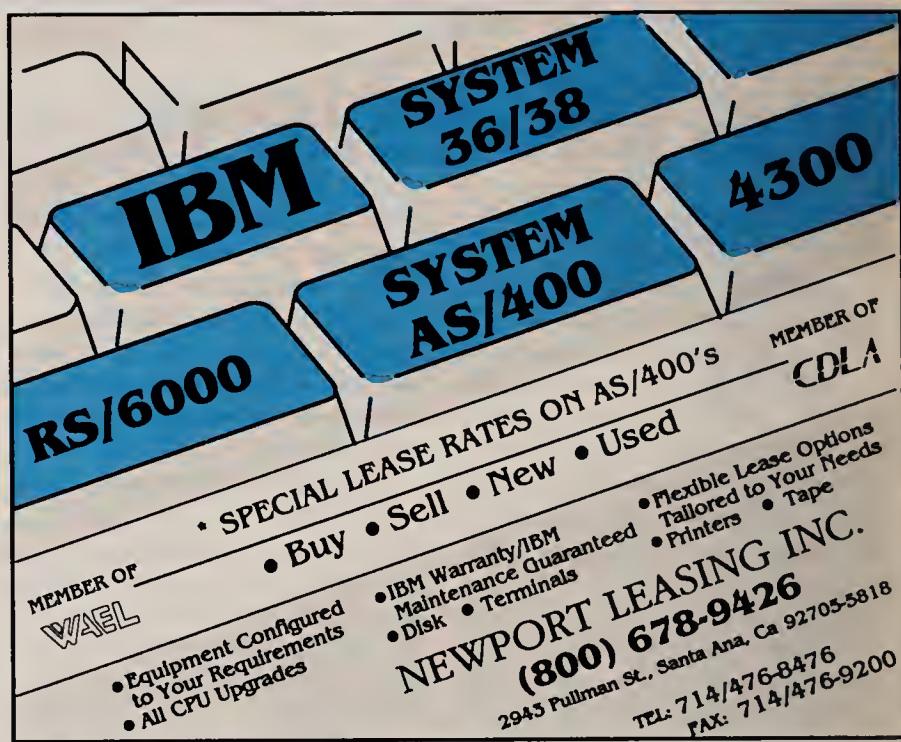
**1-800-FOR-RISC**  
 (1-800-367-7472)

612-942-9830

DataTrend...  
 IBM Business Partner  
 IBM Industry Application Specialist  
 IBM Subcontractor  
 IBM DAE Enabler  
 IBM Account Team Partner

## REMEMBER...

DataTrend is also  
*World Leader*  
 in Series/1


**SPECTRA**

The complete computer equipment dealer

(714) 970-7000 (800) 745-1233 (714) 970-7095 FAX

## BUY • SELL • RENT • LEASE

New &amp; Used: Processors Peripherals Upgrades

ES/9000, 9370, 4381

AS/400, RS/6000

SYSTEM/88

Point of Sale

Banking

CAD/CAM

**digital**  
**Stratus**  
  
**amdahl**  
**TANDEM**

...and more!

ANAHEIM CORPORATE CENTER 5101 E. LaPalma Ave., Anaheim, California 92807

## Index of used computer prices

Week ending November 6, 1992

	Closing Prices	
	BoCoEx	AmCoEx
IBM AT 339	\$400	\$375
PS/2 Model 30 286	\$500	\$425
PS/2 Model L40SX	\$1,000	\$975
PS/2 Model 55SX	\$850	\$850
PS/2 Model 60	\$600	\$525
PS/2 Model P70	\$1,650	\$1,450
PS/2 Model 80	\$1,200	\$1,150
PS/2 Model 90	\$3,100	\$2,925
Compaq Portable II	\$425	\$350
Portable III	\$500	\$450
Portable 386	\$950	\$900
SLT-286	\$700	\$700
LTE-286	\$800	\$750
DeskPro 386s	\$900	\$825
DeskPro 386/33	\$1,600	\$1,625
Apple Macintosh Classic	\$750	\$675
SE	\$675	\$675
IIX	\$2,400	\$2,125
IICI	\$2,700	\$2,475
IIFX	\$3,750	\$3,700

INFORMATION PROVIDED BY BOSTON COMPUTER EXCHANGE, BOSTON, MASS., AND  
 AMERICAN COMPUTER EXCHANGE, ATLANTA, GA.

# 9370/9221?

## EXECUTIVE INFOSOURCE!

## BUY SELL LEASE

Most Machine Features  
And Peripherals  
**IN STOCK**

TELEPHONE: (708) 215-9370

FAX: (708) 215-9992

## REFURBISHED/USED

- UPS SYSTEMS
- STANDBY GEN SETS
- LIEBERT A/C
- ACCESS FLOORING

262 S. Military Trail  
 Deerfield Beach, FL 33442

1-800-226-0784  
 305-425-0638

Over  
 629,000  
 computer  
 professionals  
 read  
 Computerworld  
 weekly.

## PRODUCT CLASSIFIED PAGES

Where  
 America's  
 Computer  
 Professionals  
 Shop

**(800) 343-6474**  
 (in MA; 508/879-0700)

## USE OUR TECHNOLOGY TO YOUR FINANCIAL ADVANTAGE

Hundreds of Large and  
 Small Companies Gain a  
 Competitive Advantage by  
 Using Comdisco's Nation-  
 wide Remote Computing,  
 Information Technology  
 Sourcing and Global Data,  
 Voice and Video Network.

## Featuring:

- IBM® CPUs and Peripherals
- Full Range of Systems Software
- Database and Applications Software Support
- Technical & Financial Planning
- Disaster Recovery
- Service Level Guarantees
- Capacity & Platform Transition Planning
- Financial Asset Management

Call: Bob Marino

800-227-6584

COMDISCO COMPUTING  
 SERVICES CORP.  
 430 Gotham Parkway  
 Carlstadt, NJ 07072  
 (201) 896-3011

## Time/Services

# ANOTHER REASON WHY COMPUTERWORLD PRODUCT CLASSIFIED PAGES WORK ...

Computerworld's Product Classified Pages give you 51 opportunities to advertise in 1992 - and needs as little as 2 working days notice before each Monday issue to run your advertisement!

Mon.	Tues.	Wed.	Thur.	Fri.
		Space Res & Mats Close	1	2
Issue Date				

To place your ad, call John Corrigan, Vice President/Classified Advertising, at **800/343-6474** (in MA, 508/879-0700).

## COMPUTERWORLD

Where computer buyers meet computer sellers. Every Week.

### ALICOMP, INC.

*The "Boutique" of  
the Computer  
Services World*

VM, MVS, VSE  
Outsourcing  
Timesharing  
Consulting

Remote and On Site  
Serving Clients Since 1980

**(212) 886-3600**

 an affiliate of  
Amalgamated Life

### COMPUTERWORLD

#### Product Classified Pages

need only 2  
days notice to run  
your ad!

When you're selling, you want your advertising to hit the market quickly and frequently. You can't afford to wait for an issue that's coming out several weeks -- or months -- into the future. With Computerworld, there's no waiting for the next available issue because we've got one for you every week.

What's more, your ad can appear in the Monday issue of Computerworld if you order just 2 days prior to the issue. Advertise in the newspaper that won't keep you waiting. Advertise in Computerworld's Product Classified Pages!

For more  
information, call:

**800/343-6474**  
(in MA, 508/879-0700)

### REMOTE COMPUTING • OUTSOURCING

- MVS/ESA
- QMF
- IMS/DBDC
- MVS/XA
- CICS
- VM/370
- DB2
- TSO
- DOS/VSE

OVER 150 SOFTWARE PRODUCTS

- DEVELOPMENT
- DEBUGGING
- PRODUCTIVITY
- PERFORMANCE

- TELNET
- SEARSNET
- TYMNET
- IBM INFORMATION NETWORK

EXTRAORDINARY CUSTOMER SERVICE  
MIGRATION MANAGEMENT

**GIS** INFORMATION  
SYSTEMS, INC.

815 Commerce Drive, Oak Brook, IL 60521

New England  
**617-595-8000**

### REMOTE COMPUTING OUTSOURCING TIMESHARING

#### COMPUTER RESERVES will

- Nationally search for all platforms.
- Match your exact specifications.
- Locate multiple vendors.
- Help negotiate the lowest price.

1200 placements in 25 years.  
Never a charge to the buyer because  
our fee is paid by the seller.

**CALL DON SEIDEN**

**1 800 882-0988 NJ 201 882-9700**

## Education/Training

CALL NOW FOR...

### Dr. James Martin's

Video Education Courses on:



- Object Oriented
- Client Server & Downsizing
- CASE, Techniques & Methodology
- Imaging & Information Management
- Re-Development, Reusability & Re-engineering

For your FREE  
James Martin Insight  
Courseware Catalog  
on Diskette

**Call 1-800-526-0452**

JAMES MARTIN  
INSIGHT  
INC.

### COMPUTERWORLD

#### Product Classified Pages

Examine the issues  
while computer  
professionals  
examine your message.

Call for all  
the details.

**(800) 343-6474**  
(in MA, 508/879-0700)

### JAMES MARTIN WORLD SEMINAR

*"The Computer Industry's  
Most Valuable Seminar"*

NYC LA  
Nov. 9-12 Nov. 16-19

Orlando  
"Disney World"  
Dec. 7-10

Extended Intelligence, Inc.  
Phone: (312) 346-7090  
Fax: (312) 372-7762

### Used Equipment Listings

**USED 3480-3490 STORAGE RACKS** - Save on 3480- and/or 3490 Tape Cartridge Storage Racks. We have used double-sided (960 cartridges capacity) or single-sided (480 cartridges capacity). Delivery Available. Like New Condition - call for Pricing. 412-937-1880.

### Product Showcase

**UNIX in MINI**  
**THE ULTIMATE  
UNIX TOOLBOX**  
Eliminate the UNIX Learning Curve  
PinQuik™

- Makes UNIX easy for the end user
- Automated Unix Commands
- Safety Net
- Look the same on all UNIX
- Menu Builder
- Distributor inquiries welcome

♦30 DAY MONEY BACK GUARANTEE♦

**PRO/SIM™**

14201 Memorial Drive, Suite 4  
Houston, TX 77079

CALL TO ORDER or FAX.  
**713-558-6866**  
Fax: 713-558-8857

**COMPRESSION**

#### Mainframe-PC File Compression

STASH - multi-platform compression utility. Compress and uncompress the same files on VM/MVS/TSO mainframes and on DOS or Windows PC's transparently. Significantly reduces file transfer time/cost and saves disk space. Call for more information:

**Adlersparre & Associates Inc.**

501-1803 Douglas Street  
Victoria, BC V8T 5C3  
1-604-384-1118  
Fax: 1-604-384-3363

**COMPSEE**  
Your Single Source For  
DATA  
COLLECTION  
Systems  
SOLUTIONS

**BAR  
CODE DATA  
COLLECTION**

COMPSEE, a leading manufacturer and supplier of Bar Code Technology, is committed to providing its customers and partners with total data collection solutions.

COMPSEE offers a complete portfolio of quality bar code and data collection devices including readers, printers, verifiers and portable terminals with either batch or RF capabilities.

COMPSEE extends customer assistance in the areas of Data Flow Analysis, Equipment Selection, Application Programming, Installation and Training and After Sales Service.

**COMPSEE**

1501 R. J. Conlan Blvd. Palm Bay, FL 32905

**1 (800) 628 3888**

Tel: (407) 724-4321  
Fax: (407) 723-2895

## Product Showcase

**MVS**  
**STANDARDS ON-LINE**

**MVS Standards and Procedures On-Line**

Now you can get MVS & DB2 Standards on-line with Chicago-Soft's MVS/SOP & DB2/SOP software products. For a free 30-day trial, call...

*Chicago-Soft*  
603-643-4002



**FAX = SCANNER**  
Enables Your FAX MACHINE to Become a SCANNER SOFTWARE HARDWARE

**Features:**

- Word processor compatible
- Mouse compatible
- Phone book for easy fax dialing
- User friendly
- Edit graphics, images, photos, and text
- Include all tools for a laser quality fax
- Folders for filing faxes and name cards
- Full page scanning

**FXSCAN ONLY \$99.95**  
TO ORDER: 1-800-949-1292  
INFORMATION: 1-714-468-5555



**HR Pay**  
*It just makes sense.*

An Integrated, PC-Based HR and Payroll Management System

Call 800-334-5660 to receive more information

**SPECTRUM** Human Resources Systems Corporation  
1625 Broadway, Suite 2700  
Denver, CO 80202



**The Micro House Encyclopedia of Main Boards**  
"The Technician's Ultimate Solution."

Being released at Fall Comdex Booth #N6674

**MICRO HOUSE**  
4900 Pearl E. Circle Boulder, CO 80301

For details call:  
**1-800-926-8299**  
Fax: 303-443-2301

**Affix All Types of Pressure Sensitive Labels Fast and Efficiently**

A complete selection of semiautomatic and manual dispensers offer reliable trouble free affixing of all types of computer printout or printed roll labels without the need for technically trained mechanics, or skilled operators. For full information:

**Dispensa-matic Label Dispenser**  
725 N. 23rd Street St. Louis, MO 63103

**1-800-325-7303**  
Fax 1-314-621-1602



**innovative designs**  
**DB2**

**got you in a BIND?**

Building new DB2 applications? Programmer productivity suffering? Spending lots of CPU cycles on DB2 binds? Catalog lockouts occurring far too often? Scheduling binds off-hours? Packages on 2.3 won't help, it will make it worse! You'll still do all those binds and have hundreds of versioned DBRMs lying around, to boot. Sure, you could hire a DB2 expert to keep track of all your packages and DBRMs. OR you could install **DB2 Avoid Bind** and get out of a bind quick. It installs in minutes and pays for itself in weeks. From Innovative Designs, your DB2, CICS and IMS experts. 4205 Big Ranch Rd., Napa, Calif. (800) 328-2926



**9-TRACK AND 3480**  
Rock solid solutions, rock bottom prices.  
For PCs and workstations • 3480 Now With IDRCl

Exchange data with minis & mainframes - Reliable, lightweight, compact, 1600 and 6250 bpi 9-track solutions manufactured by Overland Data - PC solutions include the latest Overland Data controllers and DOS software - Many workstation platforms are supported too. Call today.

**OVERLAND DATA**  
San Diego, CA - Since 1980  
EUROPE: (+49) 6172-35027 - Fax: (+49) 6172-35028  
See us at COMDEX booth S630

**800-729-8725**  
619-571-5555 - Fax: 619-571-0982



**ELECTRONIC COMPUTER GLOSSARY**

**Technical Writers: GET SMARTER!**

More than 5,000 definitions in this award-winning, mini-encyclopedia of the computer industry will help you write better and more technically correct. Covers PCs, Macs, minis, mainframes, UNIX, desktop publishing, communications, LANs, multimedia, DOS commands, and more. The #1 computer dictionary in America! Single-user disks for DOS or Windows only \$29.95. Site licenses let you add your own terms and start at only \$100.

**The Computer Language Company Inc**  
5521 State Park Road  
Point Pleasant, PA 18950

**1-215-297-5999**  
Fax: 1-215-297-8424

# Solutions Directory

A listing of professional services providers.

## BANKING/FINANCIAL

Automated Financial Systems, Inc.  
Exton, PA ..... (215) 524-9300  
Automated Systems, Inc.  
Sioux Falls, SD ..... (605) 335-3636  
Bankers Systems, Inc.  
St. Cloud, MN ..... (612) 251-3060  
Computer Assist.  
West Hartford, CT ..... (203) 521-3284  
DHI Computing Services, Inc.  
Provo, UT ..... (801) 373-8518  
Diebold, Inc.  
N Canton, OH ..... (216) 489-4000  
Early, Cloud, & Co.  
Newport, RI ..... (401) 849-0500  
EDS  
Belpre, OH ..... (614) 423-9501  
ERI  
Hauppauge, NY ..... (516) 752-0585  
Flserv, Inc.  
Milwaukee, WI ..... (414) 546-5000  
Information Technology, Inc.  
Lincoln, NE ..... (402) 421-4217  
Logica North America, Inc.  
Waltham, MA ..... (617) 890-7730  
National Computer Systems, Inc.  
Eden Prairie, MN ..... (612) 829-3000  
Selecterm, Inc.  
Danvers, MA ..... (508) 777-5202  
SNAP Software, Inc.  
Manchester, NH ..... (603) 623-5877  
Systeme Corp.  
Maitland, FL ..... (407) 875-1234  
Sanguard Trust Systems, Inc.  
Charlotte, NC ..... (704) 527-6300  
The Casnet Group, Inc.  
Canton, OH ..... (216) 436-2877  
Ultradata Corp.  
Pleasanton, CA ..... (510) 463-8356  
Xyquad, Inc.  
St. Louis, MO ..... (314) 961-5995

## CONSUMER PKG GOODS

Information Resources  
Waltham, MA ..... (617) 890-1100

## EDUCATION

Computer Management Dynamics, Inc.  
Amherst, NH ..... (603) 472-5711  
Datatel, Inc.  
Fairfax, VA ..... (703) 968-9000  
Pentamont Enterprises, Inc.  
Bethlehem, PA ..... (215) 691-3616

## ELECTRONICS

Computer Recognition Systems, Inc.  
Ayer, MA ..... (508) 772-3991  
Genrad, Inc.  
Concord, MA ..... (508) 369-4400

## ENGINEERING

Harper Shuman, Inc.  
Cambridge, MA ..... (617) 492-4410  
Parametric Technology, Inc.  
Waltham, MA ..... (617) 894-7111  
Teradyne, Inc.  
Boston, MA ..... (617) 482-2700

## SOLUTIONS DIRECTORY!

Increase your sales! Advertise 26 weeks  
in Computerworld's new Solutions  
Directory. Just \$499 for all 26 weeks.

800 343-6474 ext. 744

## GENERAL BUSINESS

AmeriData, Inc.  
Minneapolis, MN ..... (612) 557-2500  
AVNET Computer  
Culver City, CA ..... (213) 558-2663  
Bedford Computer Systems, Inc.  
N Billerica, MA ..... (508) 667-2050  
Bohdan Associates, Inc.  
Gaithersburg, MD ..... (301) 258-2965  
Boston Systems Group, Inc.  
Boston, MA ..... (617) 423-1670  
Computer Cable Co.  
Bow, NH ..... (603) 228-1801  
Continental Resources, Inc.  
Bedford, MA ..... (617) 275-0850  
Data Conversion, Inc.  
Cambridge, MA ..... (617) 354-7424  
National Data Products, Inc.  
Clearwater, FL ..... (813) 442-8400  
National Tech Team, Inc.  
Dearborn, MI ..... (313) 277-2277  
Ross Systems HP  
Waltham, MA ..... (617) 622-1414  
Sentinel Business Systems, Inc.  
Milford, CT ..... (203) 874-3199  
Trellis Software, Inc.  
Hopkinton, MA ..... (508) 435-3066  
Vitek Systems Distribution  
Carlsbad, CA ..... (619) 431-2500

## GOV'T/MUNICIPALITIES

Centel Federal Systems, Inc.  
Reston, VA ..... (703) 758-7000  
Data Plaza  
Providence, RI ..... (401) 421-8500  
Global Software, Inc.  
Duxbury, MA ..... (617) 934-0949  
HTE, Inc.  
Orlando, FL ..... (407) 841-3235  
Manatron, Inc.  
Kalamazoo, MI ..... (616) 375-5300  
Micro Research Industries  
Falls Church, VA ..... (703) 573-9538  
Network Computing Corp  
Charlotte, NC ..... (704) 525-8810  
Powersoft Corp.  
Burlington, MA ..... (617) 229-2200

## HEALTH CARE

Analogic Corp.  
Peabody, MA ..... (508) 977-3000  
Automation Research Systems, Ltd.  
Alexandria, VA ..... (703) 824-6400  
Biorad Laboratories  
Cambridge, MA ..... (617) 868-4330  
CIS Technologies, Inc.  
Tulsa, OK ..... (918) 496-2451  
Collaborative Medical Systems, Inc.  
Newton, MA ..... (617) 964-7880  
Computer Methods Corp.  
Livonia, MI ..... (313) 522-5187  
Continental Healthcare Systems, Inc.  
Overland Park, KS ..... (913) 451-6161  
CSC Healthcare Systems  
Farmington Hills, MI ..... (313) 553-0900  
Cycare Systems, Inc.  
Scottsdale, AZ ..... (602) 596-4300  
Datamedic Corp.  
Hauppauge, NY ..... (516) 435-8880  
Enterprise Systems, Inc.  
Wheeling, IL ..... (708) 537-4800  
First Data Corp.  
Charlotte, NC ..... (704) 549-7000  
General Computer Corp.  
Twinsburg, OH ..... (216) 425-3241  
Healthcare Services  
Melville, NY ..... (516) 293-4111

IDX  
Burlington, VT ..... (802) 862-1022  
InfoMed, Inc.  
Princeton, NJ ..... (609) 987-8181  
Instrumentation Laboratories  
Lexington, MA ..... (617) 861-0710  
Interleaf, Inc.  
Waltham, MA ..... (617) 290-0710  
Keane, Inc.  
Boston, MA ..... (617) 241-9200  
Kurzweil Applied Intelligence, Inc.  
Waltham, MA ..... (617) 893-5151  
Management Systems Associates  
Raleigh, NC ..... (919) 851-6177  
Medaphis Physician Services Corp.  
Atlanta, GA ..... (404) 319-3300  
Medi Qual Systems, Inc.  
Westboro, MA ..... (508) 366-6365  
Medic Computer System, Inc.  
Raleigh, NC ..... (919) 847-8102  
National Medical Computer Services, Inc.  
San Diego, CA ..... (619) 566-5800  
PHAMIS, Inc.  
Seattle, WA ..... (206) 622-9558  
Poorman-Douglas Corp.  
Portland, OR ..... (503) 245-5555  
Practice Management Systems, Inc.  
Needham, MA ..... (617) 455-8888  
Professional Health Care Systems, Inc.  
Los Angeles, CA ..... (213) 578-7000  
SAIC  
Troy, NY ..... (518) 283-8400  
Source Data Systems, Inc.  
Cedar Rapids, IA ..... (319) 393-3343  
Synetics Corp.  
Wakefield, MA ..... (617) 245-9090  
Tempe Computer Associates, Inc.  
New Haven, CT ..... (203) 789-8596  
The Asset Group, Inc.  
Houston, TX ..... (713) 956-5607  
Versyss, Inc.  
Westwood, MA ..... (617) 461-6400  
Wismer Martin, Inc.  
Mead, WA ..... (509) 466-0396  
Carl Zeiss, Inc.  
Thornwood, NY ..... (914) 747-1800

## HUMAN RESOURCES

Burns Consulting Group  
Scituate, MA ..... (617) 545-7614  
GENESYS Software Systems, Inc.  
Metheun, MA ..... (508) 685-5400

## INSURANCE

Agena Corp.  
Seattle, WA ..... (206) 525-0005  
Agency Management Services, Inc.  
Norwell, MA ..... (617) 982-9400  
Delphi Information Systems, Inc.  
Westlake Village, CA ..... (818) 706-8989  
Input Output Computer Services, Inc.  
Waltham, MA ..... (617) 890-2299  
Insurnet, Inc.  
Emeryville, CA ..... (510) 652-3771  
ISI Systems, Inc.  
Andover, MA ..... (508) 682-5500  
I.S.I. Systems, Inc.  
Braintree, MA ..... (617) 848-4620  
Sigma Imaging Systems, Inc.  
New York, NY ..... (212) 476-3000  
Strategic Data Systems, Inc.  
Sheboygan, WI ..... (414) 459-7999

## IMAGING

Laser Recording Systems, Inc.  
Mountain Lakes, NJ ..... (201) 402-9500

## LIBRARIES

CLSI, Inc.  
Newtonville, MA ..... (617) 965-6310  
Inforonics, Inc.  
Littleton, MA ..... (508) 486-8976

## MANUFACTURING

Bell Atlantic Software Systems, Inc.  
Sudbury, MA ..... (508) 443-7311  
GE Consulting Services, Inc.  
Rockville, MD ..... (301) 340-5100  
Gerber Scientific Instrument Co.  
S Windsor, CT ..... (203) 644-1551  
Northeast Data Systems, Inc.  
Burlington, MA ..... (617) 273-2920  
Northern Research & Engineering  
Woburn, MA ..... (617) 935-9050  
Man-Trak, Inc.  
Concord, CA ..... (510) 686-2866  
Marcam, Inc.  
Newton, MA ..... (617) 965-0220  
Matra Datavision, Inc.  
Tewksbury, MA ..... (508) 640-0940  
Racal-Redac, Inc.  
Westford, MA ..... (508) 692-4900  
Software Horizons, Inc.  
Burlington, MA ..... (617) 273-4711  
Spectrum Associates, Inc.  
Woburn, MA ..... (617) 932-0932  
Symmetrix, Inc.  
Burlington, MA ..... (617) 273-1280  
The Peak Technologies Group, Inc.  
Columbia, MD ..... (410) 992-9922  
Waters  
Marlboro, MA ..... (508) 624-8450

## MANUFACTURING SOFTWARE

Effective Management Systems  
Milwaukee, WI ..... (414) 359-9800  
North Coast Automation, Inc.  
Cleveland, OH ..... (216) 473-3800

## RETAIL

Comtek Systems, Inc.  
San Antonio, TX ..... (512) 340-8253  
Concept Systems, Inc.  
Philadelphia, PA ..... (215) 563-1425  
Dataserve, Inc.  
Eden Prairie, MN ..... (612) 829-6000  
Datatec Industries  
Fairfield, NJ ..... (201) 808-4000  
Retail Store Systems, Inc.  
Warwick, RI ..... (401) 732-3323  
Smyth Business Systems, Inc.  
N Canton, OH ..... (216) 499-6392

## SOFTWARE DEVELOPERS

Cadre Technologies, Inc.  
Providence, RI ..... (401) 351-5950  
Stepstone Corp.  
Sandy Hook, CT ..... (203) 426-1875  
Vanguard Software  
Hudson, MA ..... (508) 562-7711

## UTILITIES

Kaye Instruments, Inc.  
Bedford, MA ..... (617) 275-0300  
OASIS Technology, Inc.  
Oxnard, CA ..... (805) 988-1020

## WHOLESALE DISTRIBUTION

Daly & Walcott, Inc.  
W Warwick, RI ..... (401) 823-8400  
National Distributor Systems, Inc.  
Stratford, CT ..... (203) 378-6010  
SI Handling Systems, Inc.  
Easton, PA ..... (215) 252-7321



# Companies in this issue

*Page number refers to the page on which the story begins.*

3Com Corp. .... 103

## A

ABB Environment Systems, Inc. .... 166  
ABB Systems Control Corp. .... 107  
Aberdeen Group .... 24  
ACG, Inc. .... 49  
Adaptive Corp. .... 99  
Computer Communications, Inc. .... 103  
Advanced Logic Research, Inc. .... 14  
Advanced Technologies Group .... 127  
Allied Signal Aerospace .... 166  
Amdahl Corp. .... 197  
American Management Systems .... 16  
AMI .... 156  
Analog Devices, Inc. .... 28  
Andersen Consulting .... 10  
Andrew Corp. .... 1  
Apple Computer, Inc. .... 1,4,6,14,35,46,169  
Ardis .... 10  
Artisoft, Inc. .... 49  
A&S Building Systems, Inc. .... 166  
Associated Insurance Cos. .... 113  
AST Research, Inc. .... 14,35,160  
Atex, Inc. .... 92,113  
AT&T .... 10,166  
Autodesk, Inc. .... 156,166

## B

Baltimore Gas and Electric .... 1  
Baneomer .... 1  
Bank of New York .... 197  
Banyan Systems, Inc. .... 49,99  
Barnett Technologies, Inc. .... 127  
Baseline Software .... 35  
BASF Corp. .... 99  
Bay Partners .... 197  
Beeton Dickinson Corp. .... 6  
Bi-Lor, Inc. .... 113  
BIS Strategic Decisions .... 35,105  
BitWise Designs, Inc. .... 196  
Black & Decker Corp. .... 166  
BlackCurrant Technology .... 46  
Blue Cross/Blue Shield .... 127  
BMC Software .... 16  
Boeing Computer Services Co. .... 16  
Booz, Allen & Hamilton, Inc. .... 1  
Borland International, Inc. .... 12,14,35  
Bose Corp. .... 4,148  
Boston College .... 16  
Brooktrout Technology, Inc. .... 196  
BT North America, Inc. .... 105  
Bull HN Information Systems, Inc. .... 16  
Business Research Group, Inc. .... 49

## C

Cabletron Systems, Inc. .... 99,103  
Cadwalader Wickersham & Taft .... 166  
Candle Corp. .... 6  
Carnegie Mellon Graduate School of Industrial Administration .... 16  
Cascade Communications Corp. .... 108  
Chase Manhattan Bank .... 16  
Chevron Canada Ltd. .... 35  
CHF Industries, Inc. .... 6  
Chips and Technologies, Inc. .... 14  
Cincinnati Bell Information Systems, Inc. .... 10  
Cisco Systems, Inc. .... 1,99,103,197  
Citibank .... 4  
CitiBank Telemarketing Services .... 113  
City of New York .... 99  
Claris Corp. .... 46  
Cobb-Vantress, Inc. .... 166  
Compaq Computer Corp. .... 1,4,35,105,160,166  
Compass Computer Service .... 166  
Computer Associates International, Inc. .... 6,14  
Computer Mall Services, Inc. .... 108  
ComputerLand Corp. .... 1,166  
Comshare, Inc. .... 16  
Connecting Point .... 1  
Conoco, Inc. .... 14  
Control Data Systems, Inc. .... 197  
Corollary Systems, Inc. .... 14  
Crescendo Communications, Inc. .... 92  
CrossComm Corp. .... 1  
Cirix .... 156

## D

Dallas/Fort Worth International Airport .... 120  
Data 3 Systems, Inc. .... 6  
Dauphin Technology, Inc. .... 14  
Defense Advanced Research Projects Agency .... 35  
Dell Computer Corp. .... 14,160  
DelMonte Foods .... 127  
Demax Software .... 35  
DHL Airways, Inc. .... 4  
Digital Communications Associates, Inc. .... 107  
Digital Equipment Corp. .... 4,14,16,24,89,92,99,169,198  
Digital Equipment Corp. Users Society .... 24  
Dunn & Bradstreet Corp. .... 1  
DynCorp. .... 35

## E

Electronic Data Systems Corp. .... 16,169,197  
EMC Corp. .... 8  
EO, Inc. .... 105  
Epoch Systems, Inc. .... 6  
Epson America, Inc. .... 14  
Ergo Computing, Inc. .... 35,46  
Ernst & Young .... 127  
Export-Import Bank of the U.S. .... 197

## F

Federal Aviation Administration .... 107  
Federal Communications Commission .... 10  
Federal Express Corp. .... 148  
Fore Systems, Inc. .... 99  
Forward Concepts Co. .... 28  
Fox Software, Inc. .... 12  
Frontier Technologies Corp. .... 108

## G

Gandalf Systems, Inc. .... 116  
Gateway 2000, Inc. .... 160,166  
GE Aircraft Engines, Inc. .... 4  
Gemisys .... 120  
General Accident Insurance Company of America .... 8  
General Electric Corp. .... 6  
GTE Corp. .... 169  
GTE Telephone Operations, Inc. .... 4

## H

Hambrecht & Quist, Inc. .... 4  
Handy and Harman, Inc. .... 148  
Hewlett-Packard Co. .... 4,24,35,127,169  
Hitachi Data Systems Corp. .... 16,197  
Holiday Inn Worldwide .... 1

## I

IBM .... 1,4,6,8,10,12,14,16,35,89,92,99,120,124,127,160,161,166,197,198  
Information Systems, Inc. .... 14  
Informix Software, Inc. .... 6  
Integrated Surgical Systems, Inc. .... 16  
Intel Corp. .... 28,35,46,163,164,169  
Interdata .... 124  
InterLab .... 1  
International Communications Association .... 10  
Interpractice Systems .... 169  
InterWest Partners .... 197

## J

J. F. Shea & Co. .... 197  
Jones, Day, Reavis & Pogue .... 53

## K

Keydata International, Inc. .... 35  
KineticSystems Corp. .... 124  
Kizan Technologies, Inc. .... 128

## L

Legato Systems, Inc. .... 89  
Lehman Brothers .... 99  
Levi Strauss & Co. .... 127,172  
Logitech, Inc. .... 14  
Lotus Development Corp. .... 14,15,35

## M

MacSoft, Inc. .... 53  
Magnus Software Corp. .... 120  
MarketPulse .... 120  
Martin Marietta Corp. .... 4,16  
Macy's .... 198  
McGraw-Hill, Inc. .... 16  
MCI Communications Corp. .... 10  
Mellon Bank .... 127  
Micro City .... 166  
Microsoft Corp. .... 1,6,12,14,20,24,28,35,38,46,49,92,105,124,128,164,166,198  
Motorola, Inc. .... 10,35,99

## N

NCR Corp. .... 6,14,169  
NetLink, Inc. .... 103  
Network Computing, Inc. .... 105  
Network Connections .... 166  
New England Electric Co. .... 44  
New York Life Insurance Co. .... 1,120  
Next, Inc. .... 10  
Nielsen Marketing Research .... 128  
Nihon Unisys Ltd. .... 6  
Nikkei Computer Magazine .... 6  
Nokia Mobile Phones, Inc. .... 35  
Nolan, Norton & Co. .... 24  
Northern Telecom, Inc. .... 105,116  
Northgate Computer Systems, Inc. .... 14,198  
Novell, Inc. .... 12,16,35,49,105,162,197  
Novon Research Group .... 15

## O

Ohio Valley General Hospital .... 148  
Oracle Corp. .... 15,35,169

## P

ParePlace Systems, Inc. .... 127  
Performance Computing, Inc. .... 12  
Perot Systems Corp. .... 10  
Pershing, Inc. .... 8  
Personal Computer Memory Card Interface Association .... 14,35  
Pfizer, Inc. .... 1  
Phoenix Technologies Ltd. .... 156  
Plaid Brothers Software .... 128  
Prime Computer, Inc. .... 120  
Primerica, Inc. .... 10  
Proteon, Inc. .... 1,99,103  
Prudential Investment Corp. .... 1

## Q

Quadtel .... 156

## R

RaceCore Computer Products, Inc. .... 96  
RAM Mobile Data .... 10  
Reach Software .... 197  
Reltech Products, Inc. .... 124  
Reply Corp. .... 14  
Reusable Solutions Inc. .... 127  
Ring Access, Inc. .... 1  
Rockwell International Corp. .... 28

## S

Salomon Brothers, Inc. .... 16  
Salt River Project .... 127  
SAS Institute, Inc. .... 113,169  
Sequent Computer Systems, Inc. .... 169  
ServicePoint Development Corp. .... 105  
Sharp Corp. .... 14  
Shiva Corp. .... 96  
Siemens/Nixdorf .... 120  
Silicon Graphics, Inc. .... 169  
Sitka, Inc. .... 49  
Software Publishers Association .... 46  
Sommers & Associates .... 196  
Space Telescope Science Institute .... 24  
Spiegel, Inc. .... 113  
Sprint Corp. .... 10,16,197  
SQL Corp. .... 169  
SRI International .... 105,135  
SSU Services .... 148  
STAT Resources .... 148  
Storage Technology Corp. .... 6,8  
Stratus Computer, Inc. .... 120  
Stride-Rite Corp. .... 150

Sun Microsystems, Inc. .... 4,6,24,35,89,127,169  
Sunsoft, Inc. .... 19  
Supercomputing '92 Conference .... 16  
Sutter General Hospital .... 16  
Sybase, Inc. .... 12,15,35,127,169  
Symantec Corp. .... 163  
Sync Research .... 1  
System Software Associates, Inc. .... 108  
System Source .... 166  
Systems Union, Inc. .... 96

## T

Tandem Computers, Inc. .... 35,116  
Tele-Communications Association .... 10  
Telematics International, Inc. .... 105  
Telephoto Communications, Inc. .... 96  
Texaco, Inc. .... 169  
Texas Instruments, Inc. .... 28  
Textron Corp. .... 166  
The ASK Group, Inc. .... 169  
The Burton Group .... 49  
The Channelmarker .... 1  
The Conference Board .... 150  
The Prudential .... 128  
The Salvation Army's Cascade Division .... 148  
The Society for World InterBank Financial Telecommunication .... 105  
Tiara Computer Systems .... 49  
Toshiba America Information Systems, Inc. .... 14  
Travelers Corp. .... 1,10  
Triumph .... 166  
Turner Corp. .... 35

## U

UDS Motorola .... 197  
Ungermann-Bass, Inc. .... 92  
Unisys Corp. .... 16,120  
United Airlines .... 169  
United Leeds Teaching Hospital .... 15  
Univac .... 148  
University of Miami .... 6  
U.S. Department of Housing and Urban Development .... 16

## V

Veritas Software Corp. .... 120  
Video Electronics Standards Association .... 14  
VTech Computers Inc. .... 197

## W

Wal-Mart Stores, Inc. .... 16  
Wang Laboratories, Inc. .... 16,53,116,197,198  
Wellfleet Communications, Inc. .... 1,99,103  
Wells Fargo Wholesale Services .... 4,148  
Woodside Technologies .... 35  
WordPerfect Corp. .... 12,53,124  
WorkGroup Solutions .... 12  
World Vision Canada .... 120

## X

XcelleNet, Inc. .... 197  
Xerox Corp. .... 113

## Z

Zachman International, Inc. .... 4  
Zenith Data Systems .... 14  
Zeos International Ltd. .... 197

# Stocks

## Gainers

## Losers

### Percent

	55.56	STORAGE TECHNOLOGY	-27.56
DIGITAL SYSTEMS INT'L INC.	55.00	ARTEL COMMUNICATION CORP.	-13.07
MEGA SOFTWARE	50.00	MICROCOM INC.	-12.50
ULTIMATE CORP.	44.62	SYSTEMS CENTER INC.	-11.32
DATARAM CORP.	36.36	CE SOFTWARE	-10.53
ROSS SYSTEMS	24.00	BORLAND INT'L INC.	-10.07
RASTEROPS	22.73	GATEWAY COMMUNICATIONS	-9.52
EMC CORP. (H)	22.06	ADOLE SYSTEMS INC.	-9.33

### Dollar

	5.63	STORAGE TECHNOLOGY	-8.75
EMC CORP. (H)	4.50	ADOLE SYSTEMS INC.	-3.50
CISCO SYSTEMS INC. (H)	4.50	BORLAND INT'L INC.	-3.38
POLICY MANAGEMENT SYS.	4.50	MATSUSHITA ELECTRONICS (L)	-3.25
DIGITAL SYSTEMS INT'L INC.	4.38	DIGITAL EQUIPMENT CORP.	-2.63
COMPUTER SCIENCES	4.00	PROGRESS SOFTWARE CORP. (H)	-2.25
PROGRESS SOFTWARE CORP. (H)	3.88	3M CORP (H)	-1.88
FILENET CORP.	3.75	DATAWARE CORP.	-1.75
DATARAM CORP.	3.63	BOOLE & BABBAGE	-1.75

## Industry Almanac

## IPOs roll on

Unaffected by a marketwide summer slump in initial public offerings (IPO), computer-related stock offerings continued unabated through the third quarter.

The dollar volume of IPOs in all industries declined by 58% in the third quarter, according to market analysis firm Sommers & Associates. The computer industry generated 12 first offerings. That number is down from 18 IPOs in the second quarter, but the total dollar amount raised was comparable.

"Within the computer industry, there has been pretty consistent performance over the past three quarters," said Tom Sommers, president of the Houston-based company. Sommers noted that the overall market trends in IPOs have been driven mostly by demand for biotech and health care industry issues.

Companies pursue public stock offerings for a number of reasons. The IPO often provides a payback for venture capitalists who have funded the company's startup. According to Steve Ide, vice president of sales and marketing at newly public Brooktrout Technology, Inc. (BRKT), "Our investors wanted to have some liquidity. More importantly, though, we needed additional cash to fund the next level of future growth."

BitWise Designs, Inc. (BTWS)'s IPO in May raised capital for production and marketing purposes. According to Chief Executive Officer John Botti, the company had fully developed a new portable workstation product, but the additional funds were used to bring the product to market. "The IPO wasn't done to raise a research budget, and I think investors liked that," Botti said.

—Derek Slater

### Grand openings

Many of the high-tech companies that have gone public in 1992 have seen an increase in their stock price. Selected issues with their initial and current share values:

Company (products)	IPO	Initial price	Current price (11/10 close)
Stac Electronics (data compression)	MAY	12	4 1/2
NetFrame Systems, Inc. (network servers)	JUNE	9	15
Creative Technologies Ltd. (multimedia products)	AUG.	12	19 1/2
Banyan Systems, Inc. (networking software)	AUG.	10 1/2	20 1/2
Computervision Corp. (CAD software)	AUG.	12	6 3/4
Netrix Corp. (telecommunications products)	SEPT.	12	17 1/4

## Computerworld Friday Stock Ticker

EXCH	52 WEEK	RANGE	Nov 13 3PM	Wk CHG	NET CHG	Wk PCT CHG
<b>COMMUNICATIONS AND NETWORK SERVICES</b> <b>Up 3.34%</b>						
OTC	23.50	9.63	3 COM CORP. (H)	21.50	-1.63	7.03
NYS	70.63	56.25	AMERICAN INFO TECHS CORP.	63.38	-0.88	1.36
NYS	45.50	32.88	AT&T	45.50	0.63	1.39
OTC	4.25	0.75	ARTEL COMMUNICATION CORP.	1.25	-0.19	13.07
OTC	22.00	10.25	BANYAN SYSTEMS INC.	20.50	1.75	9.33
NYS	49.75	40.25	BELL ATLANTIC CORP.	44.88	-0.50	1.10
NYS	55.50	43.38	BELLSOUTH CORP.	47.50	-1.38	2.81
NYS	6.75	3.63	BOLT, BERANEK & NEWMAN	5.00	0.13	2.56
NYS	73.25	36.63	CABLETRON SYSTEMS (H)	70.00	-2.25	3.11
OTC	31.00	17.50	CHIPCOM CORP.	26.00	2.00	8.33
OTC	70.25	40.25	CISCO SYSTEMS INC. (H)	70.25	4.50	6.84
OTC	35.25	5.50	COMPRESSION LABS INC.	13.75	2.13	18.28
OTC	3.38	0.88	DATAWORX CORP.	2.25	0.19	9.06
NYS	23.63	13.75	DIGITAL COMM. ASSOC.	16.50	0.13	0.76
OTC	15.25	7.50	DIGITAL SYSTEMS INT'L INC.	12.25	4.38	55.56
OTC	19.25	3.63	DS COMMUNICATIONS (H)	18.00	-0.50	2.70
OTC	10.88	4.75	FIBRONIX INT'L INC.	5.75	-0.50	8.00
OTC	37.50	10.50	FILENET CORP.	20.75	3.75	22.06
OTC	3.38	1.13	GANDALF TECHNOLOGIES INC.	2.00	0.25	14.29
OTC	2.25	0.69	GATEWAY COMMUNICATIONS	1.19	-0.13	9.52
NYS	5.50	2.38	GENERAL DATACOMMINDS	4.75	0.13	2.70
ASE	5.88	0.94	GO VIDEO	2.94	0.44	17.52
NYS	35.75	28.88	GTE CORP.	33.63	0.13	0.37
NYS	70.63	50.00	ITT CORP.	68.00	1.75	2.64
OTC	37.63	25.25	MCI COMMUNICATIONS CORP.	36.00	1.00	2.86
OTC	14.25	2.25	MICROCOM INC.	4.38	-0.63	-12.50
NYS	18.25	9.50	NETWORK EQUIPMENT TECH.	10.25	0.38	3.53
OTC	25.50	8.00	NETWORK GENERAL	16.63	0.75	4.72
OTC	20.00	8.50	NETWORK SYSTEMS CORP.	15.25	0.50	3.39
OTC	28.75	5.63	NEWBRIDGE NETWORKS CORP. (H)	28.00	0.50	1.82
NYS	49.25	30.50	NORTHERN TELECOM LTD.	39.13	0.38	0.97
OTC	33.25	22.19	NOVELL INC. (H)	32.38	0.50	1.57
NYS	88.38	69.13	NYX CORP.	79.88	0.50	0.63
OTC	37.50	14.50	OCTEL COMMUNICATIONS CORP.	20.50	0.00	0.00
OTC	9.88	3.38	PENRIL DATA COMM. NTWK'S.	4.38	-0.25	5.41
OTC	53.00	10.25	PICTURETEL CORP.	24.25	2.13	9.60
OTC	18.75	7.00	PROTEON INC.	10.13	0.25	2.53
NYS	33.75	13.88	SCIENTIFIC ATLANTA INC. (H)	33.75	3.13	10.20
NYS	70.50	56.25	SOUTHWESTERN BELL CORP.	64.38	0.00	0.00
NYS	26.38	20.75	SPRINT CORP.	25.75	0.13	0.49
OTC	21.13	4.88	STANDARD MICROSYSTEMS CORP.	21.00	0.38	1.82
OTC	67.25	15.25	SYNOPTICS COMMUNICATIONS (H)	64.50	1.50	2.38
NYS	40.00	32.88	US WEST INC.	35.50	-0.63	-1.73
OTC	58.75	24.00	WELLFLEET COMMUNICATIONS (H)	58.75	2.25	3.98
<b>PC'S AND WORKSTATIONS</b> <b>Up 0.46%</b>						
OTC	10.50	3.50	ADVANCED LOGIC RESEARCH	4.25	-0.25	5.56
OTC	70.00	41.50	APPLE COMPUTER INC.	56.00	0.25	0.45
OTC	24.50	11.25	AST RESEARCH INC.	17.50	-0.38	-2.10
NYS	19.25	6.75	COMMODORE INT'L	7.63	0.38	5.17
NYS	42.50	22.13	COMPAQ COMPUTER CORP.	42.50	0.50	1.19
OTC	37.88	13.91	DELL COMPUTER CORP. (H)	35.75	-1.63	-4.35
OTC	7.75	0.88	EVEREX SYSTEMS INC.	1.31	0.19	16.71
NYS	34.63	21.25	HARRIS CORP.	33.75	0.88	2.66
OTC	36.13	20.75	Hewlett Packard Co.	56.88	-1.75	-2.99
NYS	29.75	14.13	SILICON GRAPHICS	27.13	0.50	1.88
NYS	31.25	22.25	SUN MICROSYSTEMS INC.	34.00	-0.88	-2.51
NYS	11.13	5.00	TANDY CORP.	26.88	0.63	2.38
OTC	25.50	2.75	ZEOS INTERNATIONAL LTD.	4.00	0.00	0.00
<b>LARGE SYSTEMS</b> <b>Off 0.36%</b>						
ASE	20.63	7.75	AMDAHL CORP.	8.00	-0.75	8.57
NYS	16.38	4.75	CONVEX COMPUTER	7.75	0.00	0.00
OTC	15.88	1.88	CRAY COMPUTER	4.50	-0.25	-5.26
NYS	49.50	19.00	CRAY RESEARCH INC.	21.38	-0.38	-1.72
NYS	18.13	7.13	DATA GENERAL CORP.	10.00	-0.13	-1.23
NYS	65.50	32.88	DIGITAL EQUIPMENT CORP.	34.13	-2.63	-7.14
OTC	100.38	64.63	IBM	64.63	-1.63	-2.45
OTC	13.25	5.50	KENDALL SQUARE RE			

# Computer Industry

## In Brief

### Cisco rolls

Continuing its strong showing, Cisco Systems, Inc. last week posted first-quarter earnings of \$33.2 million, an increase of 115% from the year-earlier period. Revenue in the quarter grew 99% to \$126.3 million, the Menlo Park, Calif., internetworking vendor said.

### Wang's woes

Wang Laboratories, Inc. said revenue for the first quarter of fiscal 1993, which ended Sept. 30, was roughly \$360 million, a decrease of 22% from the comparable period last year. The Chapter 11-bound Lowell, Mass., company did not estimate its expected operations loss.

### Zeos names COO

Zeos International Ltd., coming off a string of financial reversals, has named Martyn Ratcliffe as president and chief operating officer. He succeeds founder Gregory E. Herrick, who remains as chairman and chief executive officer. Ratcliffe joins the St. Paul, Minn., PC maker after holding similar positions at VTech Computers, Inc. in Beaverton, Ore.

**Control Data's dough**  
Control Data Systems, Inc. has finally received a \$20.4 million payment from Russia's Research and Development Institute of Power Engineering for six computers sold in 1990. Control Data received an initial payment for the systems, but subsequent payments were delayed.

### UDS reinvests

UDS Motorola has acquired an additional 8% of Xcelle-Net, Inc., bringing its total ownership in the Atlanta networking company to 20%.

### IBM VP to retire

Terry Lautenbach, IBM senior vice president in charge of worldwide manufacturing and development, will retire Nov. 30 after 33 years.

# HDS eyes change

New CEO re-evaluates product mix, strategy in competitive PCM market

By Jean S. Bozman  
SANTA CLARA, CALIF.

Hitachi Data Systems Corp.'s (HDS) management style and focus may not change appreciably under new Chief Executive Officer John D. Staedke, but the company's product strategy probably will.

Staedke is not ruling out new product opportunities, although he said he intends to stick it out in the highly competitive IBM plug-compatible mainframe (PCM) business. His plans include diagnostic software and support for Unix systems software, which is proliferating as users turn to client/server systems.

"It's clear to us that there will be a significantly more rapid growth curve in the open systems area than in the industry-standard area," Staedke said, referring to IBM-compatible systems.

But HDS' project to put the Open Software Foundation's OSF/1 onto mainframes has not gone as quickly as predicted, he said. HDS has not chosen to support it or IBM's AIX—yet. "We have never provided any operating system software before," Staedke noted. "It's an option, but we have made no announcement."

### Product shift?

Staedke, who recently succeeded Gary B. Moore—HDS' CEO since the firm's inception as a joint venture between Hitachi Ltd. in Japan and Electronic Data Systems Corp. in 1989—is also looking at shifting the company's product mix. Until recently, HDS got 60% of its revenue from sales of its disk drives and peripherals and 40% from processor sales. Now that ratio is 55% peripherals and 45% processors. Staedke told *Computerworld* the goal is a 50/50 mix.

Abetting this plan, Staedke said, is the projected increase in high-end mainframe sales, which is tied largely to big corporations' continuing data center consolidation moves.

Staedke does have one luxury: HDS can afford to stick to its long-term plans without pressure from

Wall Street's quarter-to-quarter expectations. Because it is privately owned, HDS does not have to report its financial results every 90 days and can harbor resources for future projects.

In addition, corporate parent Hitachi Ltd., which owns 80% of HDS, has the deep pockets and forward-thinking corporate culture needed to support extensive product development and fine-tuning.

Staedke, who joined HDS a year ago as executive vice president of marketing from EDS where he led strategic planning, is a battle-tested manager, analysts said. He played a role in HDS' roughly 15% annual growth, even as competitors Amdahl Corp. and IBM stem erosion of their customer base with heavy discounts.

"HDS stayed focused on servicing

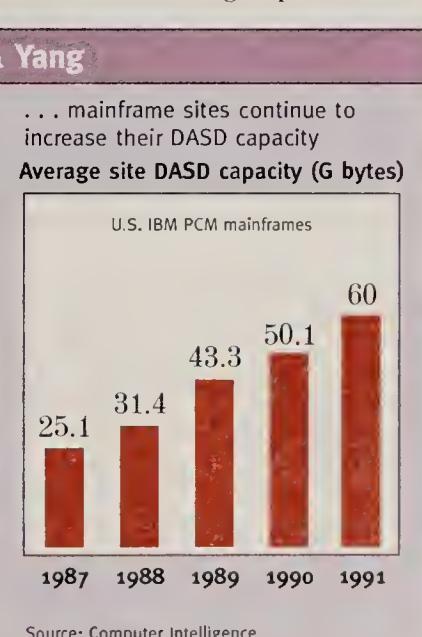


**HDS' John Staedke**  
plans to stick it out in the PCM business

**Worldwide shipments of mainframes are expected to increase 3.3% this year to 3,369, according to International Data Corp. That's a temporary gain, the research firm projects, as shipments are expected to increase only .9% in 1993 before declining 1.1% in 1994.**

beats their competitors, and that lines up with the reliability surveys we get," said Curt Bray, an information systems technical specialist at Sprint Corp. in Westwood, Kan., whose organization bought 2.2T bytes of HDS peripherals during a recent data center consolidation. Sprint also owns several HDS mainframes.

Staedke said he does not expect his tenure as HDS CEO to be remarkably different from Moore's. Moore returned to EDS last month as chairman and group executive of



the needs of large customers," said Peter Burris, director of commercial systems research at International Data Corp. in Framingham, Mass. "They've gotten pretty good at ensuring that their products behave and perform as advertised. And, they're not doing a lot of ancillary projects."

HDS' calling card is reliability and paying attention to maintenance issues, Staedke said. The firm's customers often agree.

"What we've seen over the years is that their disk drive reliability

EDS Japan.

"We are going to continue to dance with the ones that brought us here," he said, referring to Hitachi and EDS. "We're in the PCM business, and we're going to stay [there]."

He did not deny the value of having EDS as a backer. "Yes, they are a good customer," Staedke said. "But because of the size of their appetite [for equipment], all three primary providers [of IBM-compatible systems] believe EDS is a very good customer."



### Winners and losers

The American Electronics Association found good news and bad news in the recent elections, as some industry supporters on Capitol Hill were sent packing while others were re-elected. Some examples in the science and technology field:

**Defeated:**  
**Rep. Don Ritter** (R-Pa.), a senior member of the Science, Space and Technology Committee.

**Rep. Les AuCoin** (D-Ore.) in a bid for the Senate. A member of the House Appropriations Committee, AuCoin played a key role in supporting dual-use critical technology programs.

**Victorious:**  
**Rep. George Brown** (D-Calif.), chairman of the Science, Space and Technology Committee and co-author of the American Technology Preeminence Act. He co-authored the High Performance Computing Act.

**Sen. Ernest Hollings** (D-S.C.), who is considered the "father" of the National Institute of Standards and Technology and co-author of the American Technology Preeminence Act.

**Resigned:**  
**Sen. Al Gore** (D-Tenn.), chairman of the Commerce Committee's Science, Technology and Space Subcommittee, to become vice president. Gore co-wrote the High Performance Computing Act.

# Trends Network management update

## Staffing the network management effort

"Network nodes and traffic is outgrowing the ability for staff to adequately manage and maintain system"

**33%** Strongly agree

**27%** Somewhat agree

**27%** Somewhat disagree

**13%** Strongly disagree

### Personnel costs

**47%** of IS managers feel personnel costs for network management are a major concern. **42%** say they are a minor concern. **11%** are not concerned at all.

### Network downtime

Has your company estimated the cost of network downtime?

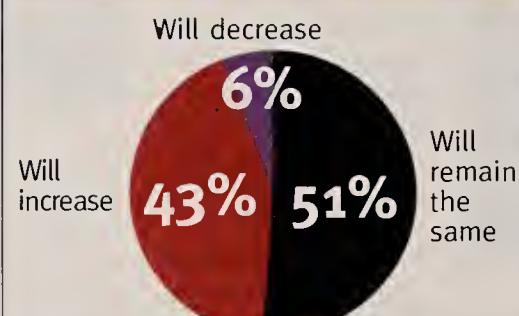
**74%** have not, **14%** have and **12%** do not know.

Base: 400 enterprise and systems managers from large and midsize U.S. companies  
Source: Business Research Group, Newton, Mass.

### How many employees does it take to manage your network?

IS staff size	Percentage of employees managing network
1-19	80%
20-49	11%
50+	7%

### How will this change in two years?



"I'M SEEING JOHN SCULLEY AND TONY BENNETT AT 10:00, AND AMY WOHL WITH WAYNE NEWTON AT 2:00. BUT I'M SKIPPING THE WORKSTATION SEMINAR AT 4:00 SO I CAN CATCH THE ELVIS IMPERSONATORS AT 5:00."

## Inside Lines

### Merry Christmas

DEC's layoffs quietly continue, according to internal sources. At least several thousand employees will have received pink slips by the second week in December. Total head-count reduction could amount to more than 10,000 during the second fiscal quarter, one source estimated. During the first fiscal quarter, which ended Oct. 1, 5,300 employees left the company. Disclosure of the cutbacks could coincide with the announcement of DEC's rebuilt business structure and additional management changes. Meanwhile, negotiations aimed at landing a U.S. sales vice president from outside the company — one with actual sales experience — may be made public this month.

### My enemy, my vendor

Dealers are upset with IBM for its ValuePoint pricing. "ValuePoint came without a suggested retail price, and then IBM quoted prices through the direct number, which de facto became the MSRP. Those prices they quoted were significantly lower margin than anything we've ever got from IBM in the past, and to make matters worse, [IBM] stated that dealers would sell probably 5% to 10% less than that — that's unconscionable," fumed Matt Fitzsimmons, a ComputerLand dealer in White Plains, N.Y. "At 10% better than what they're doing, I lose money after I pay royalties. If this is the new IBM, they better get themselves under control." An Inacom spokesman concurred: "IBM set their direct pricing in such a way that dealers have to set a pretty aggressive price just to match that price." Still, dealers want ValuePoint because they can talk to customers who left them years ago because of IBM's high pricing.

### Can we talk?

Users aren't the only ones frustrated by the inability of the major players to agree on common formats. Last week, Microsoft Senior Vice President Pete Higgins lamented on the same day that his company and Apple unveiled competing methodologies allowing Apple's QuickTime multimedia technology to run on Windows machines. "There are a lot of needless differences between the two file formats," Higgins said at the MacIS user group meeting in New Orleans. "We could and should work together to make it easier for the users."

### Singing from the same score

Microsoft, meanwhile, should release core code versions of its FoxPro, Word and Mail applications in 1993. Core code versions allow the near simultaneous release of Macintosh and Windows variants of the same application. Microsoft already has core code overlap on its Excel, Project and PowerPoint packages.

### Go East, woman!

She probably won't be marching in next week's famed Thanksgiving Day parade, but Macy's new CIO plans to relocate from San Francisco to New York soon. Rachel Graham recently took over top technology duties, replacing Leonard Bellezza, who left the company in mid-October. Officials declined to comment on the shuffle, which comes just as the bankrupt retailer finished a super-automated inventory control system designed to give Macy's buyers a better handle on what sells, what doesn't and what, if anything, can pull the world's largest department store out of Chapter 11.

### From Apple to cherry trees

John Sculley's name has been rumored for a position in the Clinton administration since the Apple exec headlined a group of pro-Clinton Silicon Valley executives. Now, sources say, Sculley has sold his house in California and purchased a retreat in Milford, Conn., for weekends off from the rigors of being Secretary of Commerce.

*You would think a PC maker would be immune from this somehow: A Northgate rep, coming around to show off the company's new notebooks to members of the press, left them under his dashboard in the front seat of the car when he made a quick stop at a Boston-area mall. A thief broke into the car, stole the notebooks and also made off with the rep's briefcase, which had all his press kits. The thief did not take the expansion station, which was out of sight in the trunk. Phone, fax or CompuServe News Editor Alan Alper with news tips (or notebook bandits) at (800) 343-6474, (508) 875-8931 or 76537, 2413, respectively. Or try Computerworld's 24-hour voice-mail tip line at (508) 820-8555.*

# Informix Database Technology Helps World Vision Reach The Children.



When World Vision, a non-profit international Christian relief and development agency, needed to manage \$225 million annually in fundraising and distribution, they turned to us, Informix, the experts in UNIX® relational database management systems.

#### **Mainframe-Caliber Performance.**

World Vision required a UNIX system that could deliver mainframe-caliber performance at a fraction of the cost. The system had to provide quick response to a large number of simultaneous users. It had to provide on-line access to donor data, including correlation of donors and recipients. And it had to be easily modified for special projects, such as emergency relief.

World Vision chose Informix's UNIX solution.

#### **One Million in Donor Database.**

All of World Vision's needs are being met—including storing 10 million donation postings, maintaining a donor database of more than a million people, making data available around the clock/seven days a week, and providing application portability, networked capabilities, and hardware independence.

World Vision and thousands of other organizations have called on us for 12 years to successfully handle their critical data.

If you're considering UNIX for data management, talk to Informix. Because we're the experts.

**Call 1-800-688-IFMX.**

**INFORMIX**

THE UNIX DATABASE EXPERTS.



Your network is a unique creature,  
and we can service  
every part.

One call to Bull, the nationwide, multi-vendor problem-solver, provides you with complete service for your network—whether it's Novell, 3COM or Microsoft—and its attached servers, workstations and peripherals. No matter how many different kinds of equipment you've linked together, we have the products and services you need. **In addition** to servicing your existing network, our TotalCare™ consultants can help you design a new one.

And we offer a wide range of software, interface cards and servers. TotalCare is completely modular, allowing you to select only those specific service options and products that fit your needs. **The fact is**, your network is a unique creation.

So call the vendor uniquely qualified to service every piece of it—Bull.

---

Worldwide  
Information  
Systems

---

**Bull** 

For a 20% discount on your first purchase of networking products and services, call 1-800-233-BULL, ext.0180.